FOUNDRY
EST. 1902 TRADE JOURNAL
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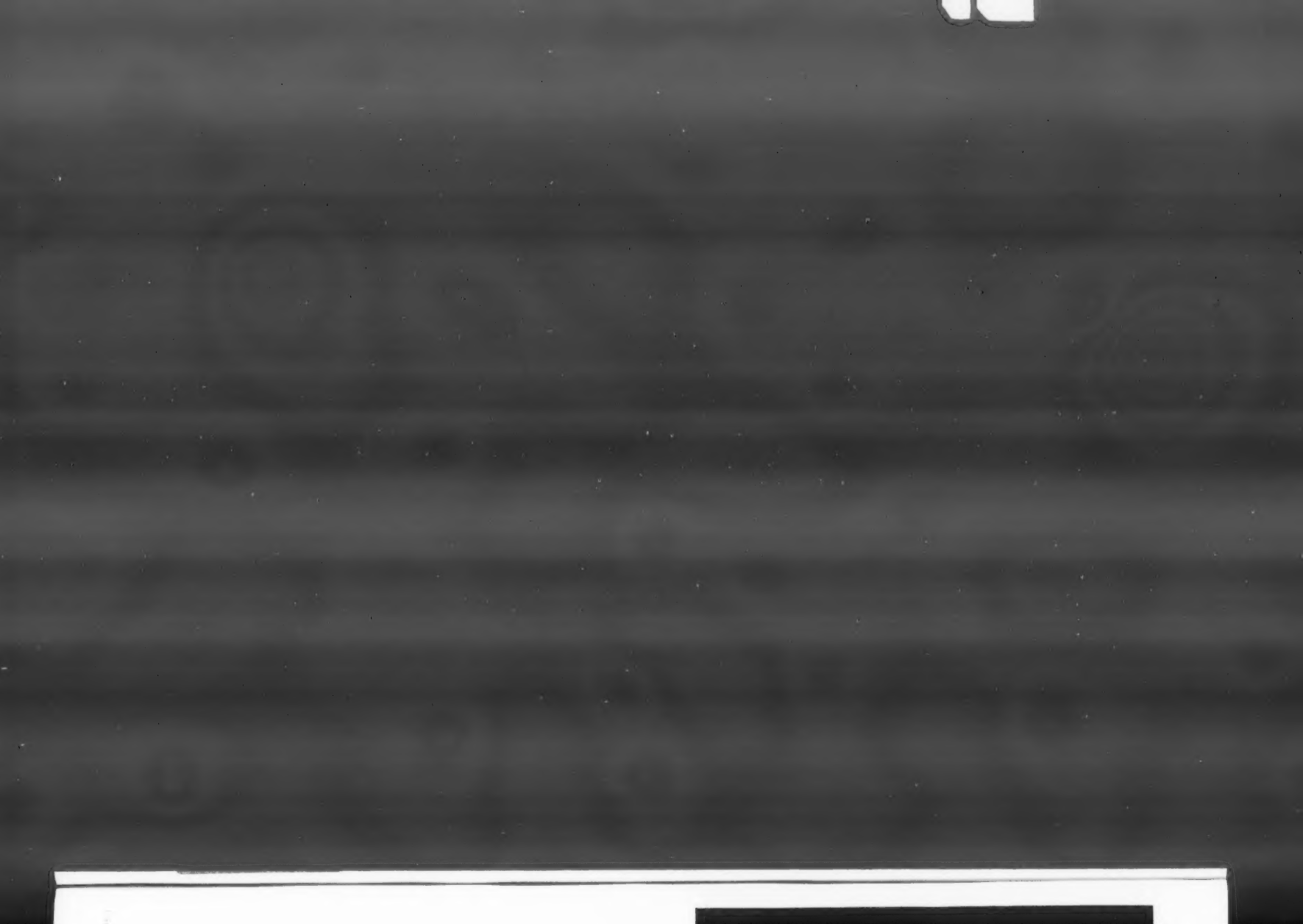

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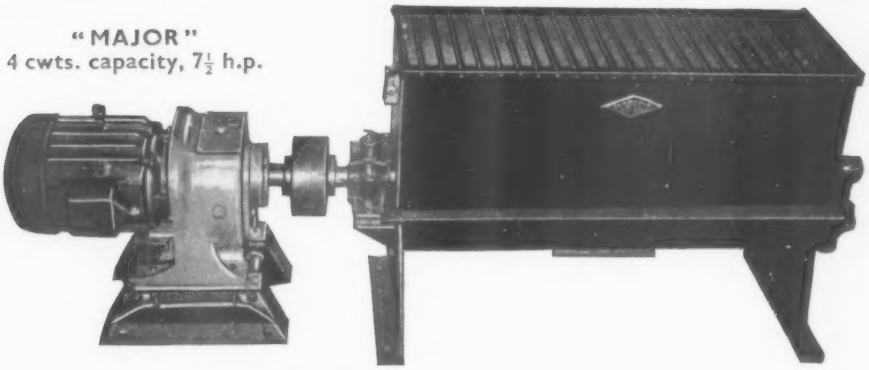

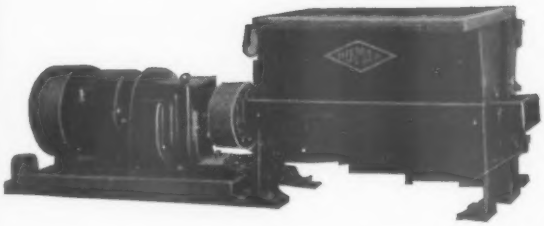

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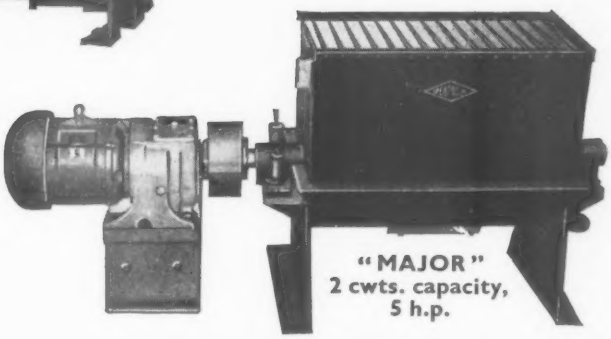

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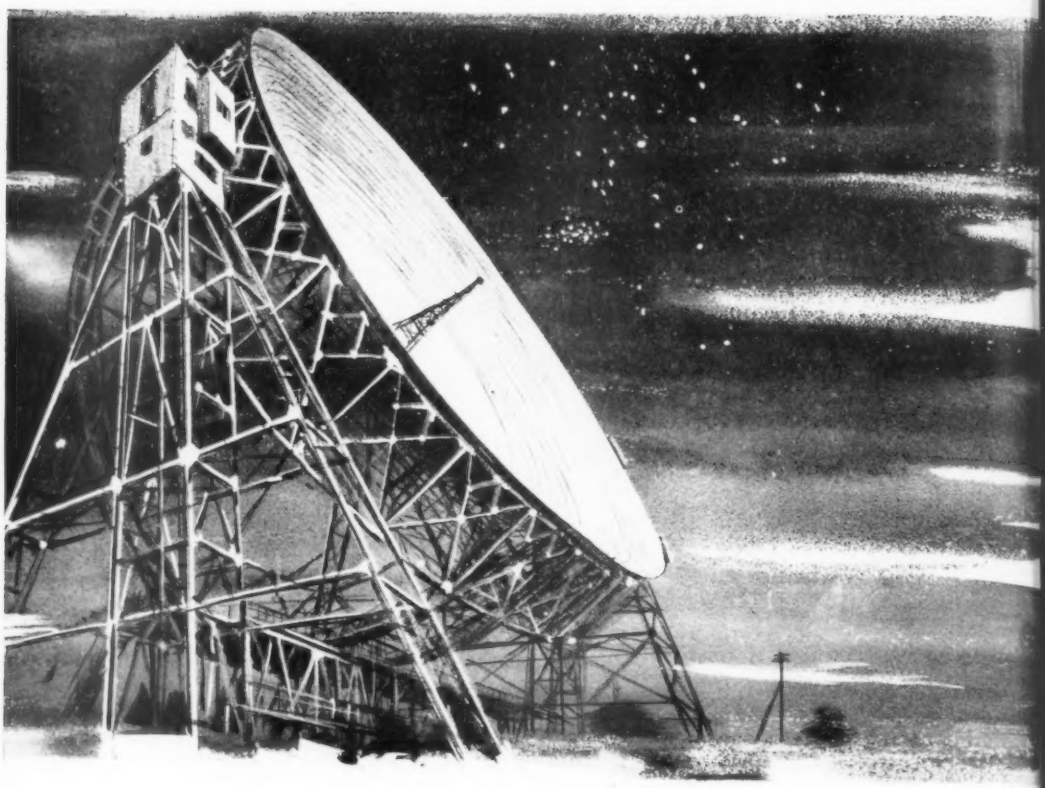

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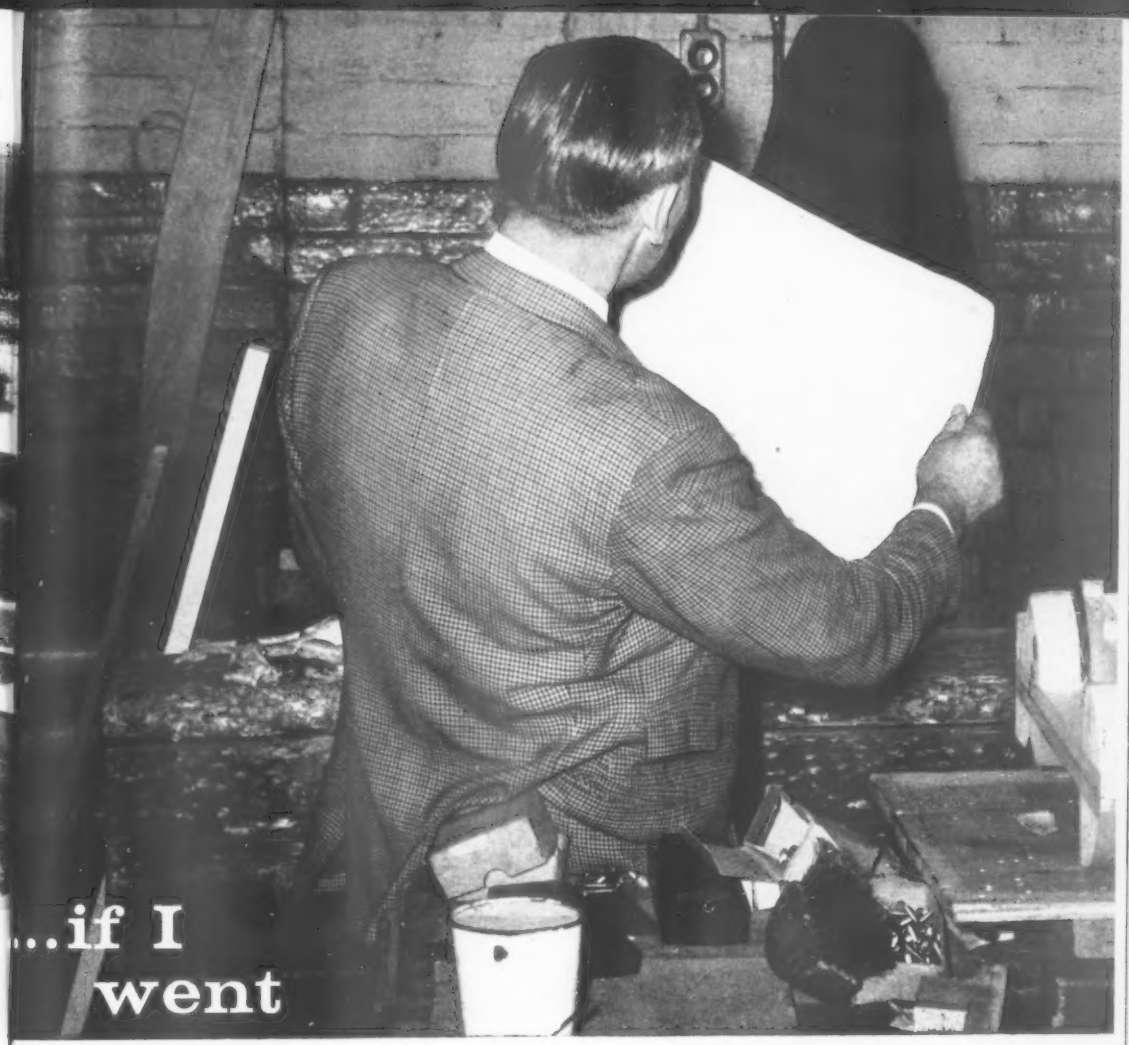

on the brains trust

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WET TYPE SPARK ARRESTERS

Designed by experts—the example shows the simple but scientific approach to a vital problem.

Photographs by courtesy of
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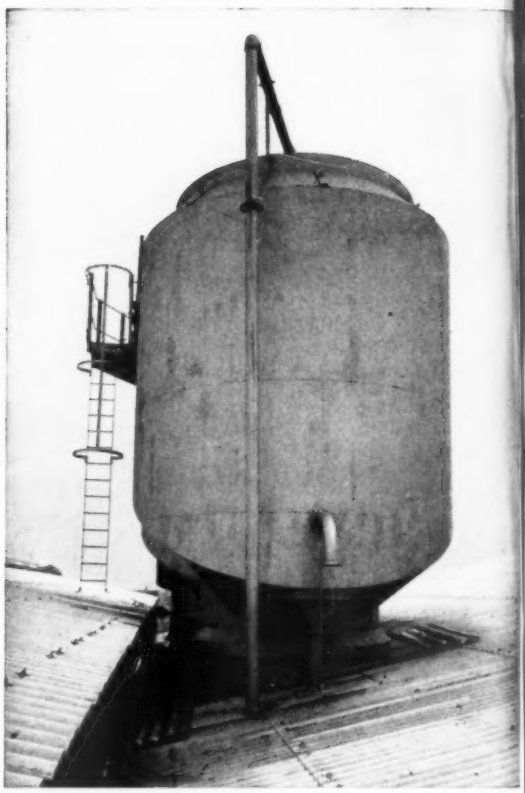

Above:

View showing Wet type Spark Arrester with Inspection Platform serving 17-ton per hour Cupolas.

Left:

This highly efficient Spark and Dust Suppressor is provided with a Spray Jet giving double water curtain as illustrated.

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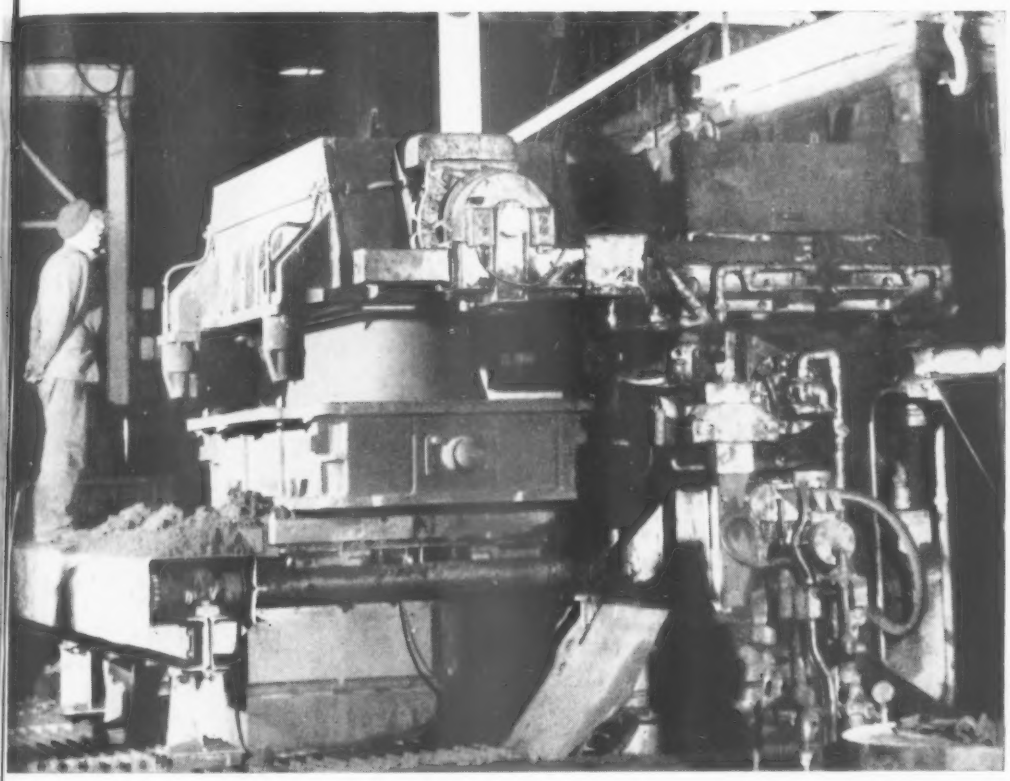

One pair of Herman machines makes 60 baths each hour in the foundry of British Bath Company Limited, Greenford. Picture shows drag machine rolled over.

Photograph by courtesy of British Bath Co. Ltd.

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A LARGE NUMBER OF THESE BOXES WERE MADE WITH ONLY ·003″ PIN CLEARANCE.
OUR CUSTOMERS ASSURE US OF THEIR COMPLETE SATISFACTION—

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ASK FOR LEAFLET
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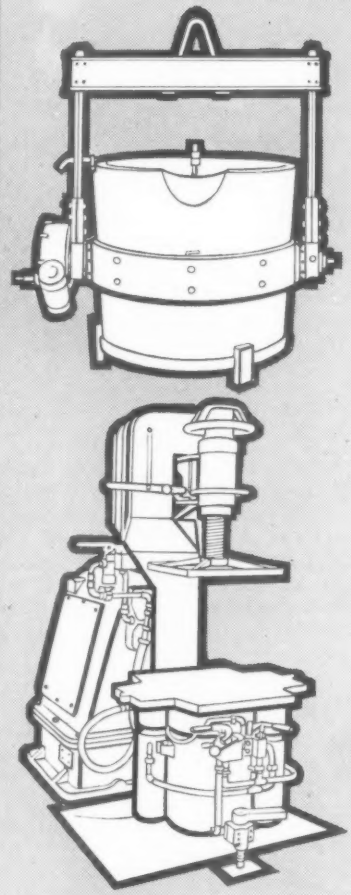
TWW FOUNDRY PLANT



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NEW VORTEC STANDARD MODEL CORE SAND MIXER: 56lb. capacity; vee belt driven from 2 H.P. Motor, 400/440/3/50 cycles supply.

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COLEMAN TYPE WT.563C SHOCKLESS JOLT SQUEEZE STRAIGHT DRAW MOULDING MACHINES, load 800lb.; pattern draw 12in.; size of table 35in. by 24in.

NEW GUYSON SHOT BLAST CABINET, size 42in. by 30in. by 36in.; complete with dust collector and extraction unit wound for 400/440/3/50 cycles supply.

THREE SECOND-HAND MORRIS TYPE "M" SCREENERATORS, motorised for 400/3/50 cycles supply.

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SHOT BLAST PLANT : RUMBLING BARRELS FURNACES : AIR COMPRESSORS AVAILABLE FROM STOCK.

WALLWORK SHOCKLESS JOLT SQUEEZE TURNOVER DRAW MOULDING MACHINE, load 300lb; pattern draw 9½in.; table 22½in. by 17¼in.

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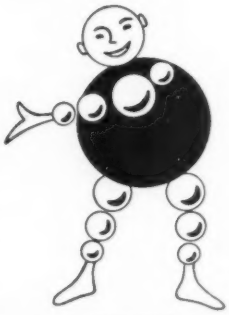
PP.19

TILGHMAN'S Dual Swing Table Wheelabrator Plant

using Wheelabrator Steel Shot

The plant illustrated is a 6ft. Dual Swing Table Wheelabrator installed at Messrs. Jarrow Metal Industries Ltd. It is engaged in cleaning a miscellaneous load of steel castings and the cleaning cycle is eight minutes. This type of plant enables one table to be unloaded and reloaded whilst the other table is under the blast stream and each table is capable of carrying two tons.

LESS THAN FIVE TONS OF STEEL SHOT CONSUMED IN 6 MONTHS



This plant was installed in November, 1956 and in May, 1957 had not used all of the 5 tons of S.460 WHEELABRATOR Steel Shot delivered.
In the first few weeks of operation the machine was working three shifts per day in order to catch up on production, but is now employed on a 44-hour week only. During five weeks of the early period, 250 tons of steel castings were Wheelabrated and maintenance replacements in this time amounted to one set of blades and one deflector plate.

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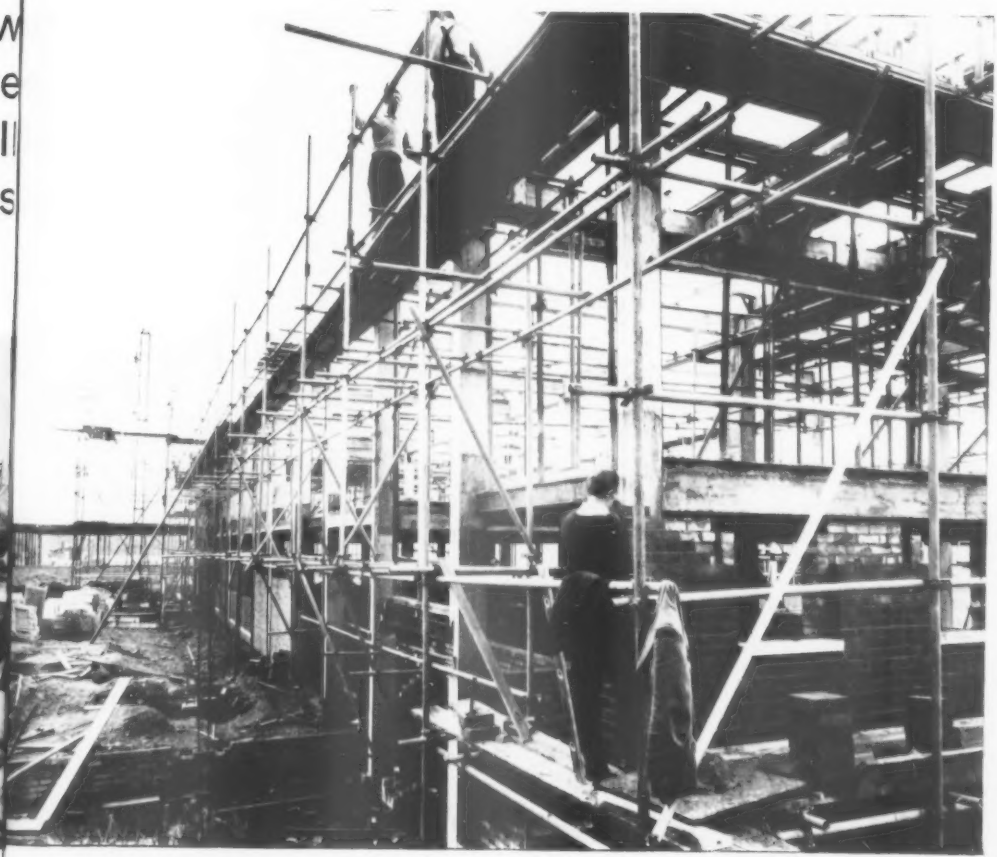

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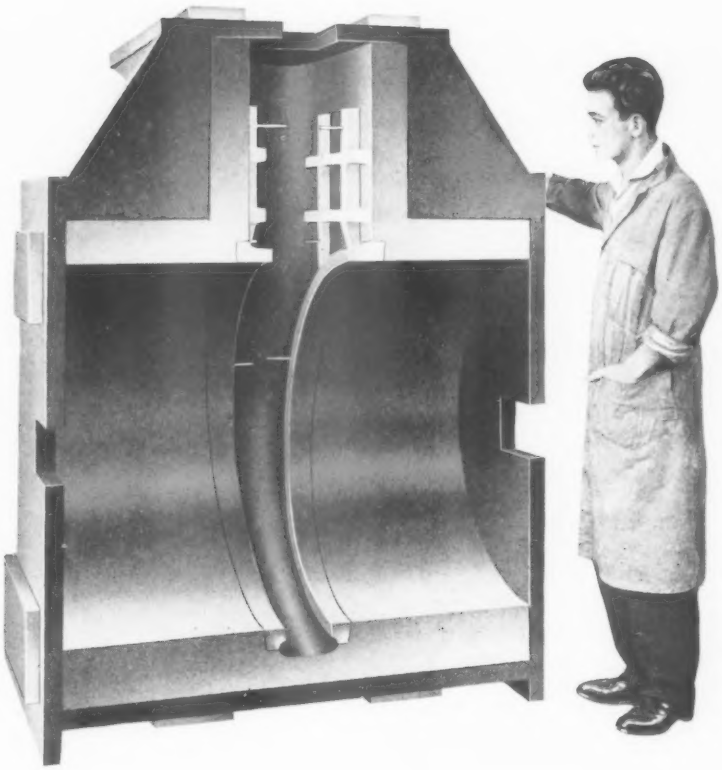

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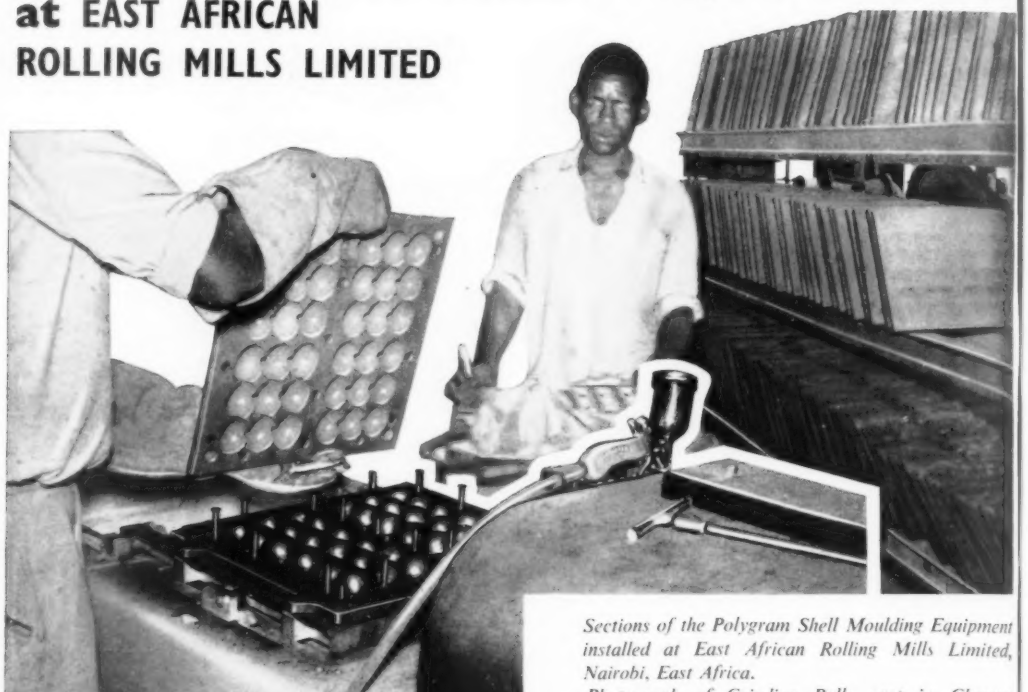

Sections of the Polygram Shell Moulding Equipment installed at East African Rolling Mills Limited, Nairobi, East Africa.
Photograph of Grinding Balls cast in Chrome Manganese Martensitic Iron Alloy.

East African Rolling Mills Limited produce large quantities of Grinding Balls for the Cement Works and Mines of East Africa. The Balls are cast in Chrome Manganese Martensitic Iron Alloy, and are vastly superior to the previously used forged steel. Production costs are considerably lower and African unskilled labour is used for the entire production.

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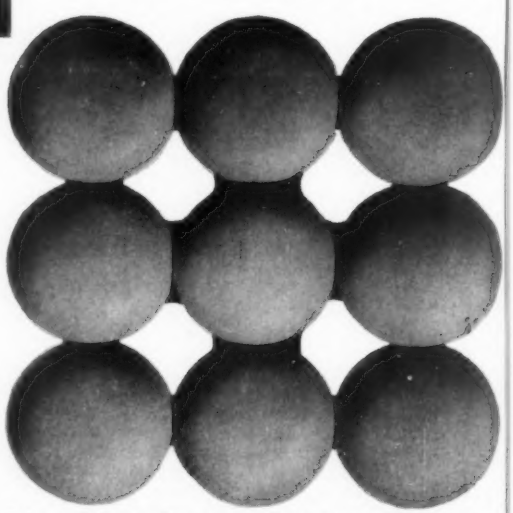
Polygram Casting Company have a competent and complete service to offer, and your enquiries are invited.

Polygram

THE FIRST NAME IN SHELL MOULDING



Polygram Casting Company Limited, Shernfold Park, Frant, Tunbridge Wells, Kent.

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trouble-free bunker discharge

The primitive, inefficient method commonly used for clearing material which sticks in a storage bunker is by applying a sledge hammer to the side of the hopper. This is a form of low frequency, uncontrolled vibration. When vibration is applied at the *correct* frequency, the *correct* amplitude and the *correct* point of application, almost any material can be satisfactorily discharged.

SINEX has the experience with a wide variety of materials and a wide range of hopper designs to recommend how vibration should be applied effectively to solve *your* particular problem.

The three examples illustrated show three different combinations which are typical of many applications, but even these, whilst using the same type of unit, can only be effective if the types of unit themselves are placed in the correct position and have the correct frequencies and amplitudes of vibration, to suit the characteristics of the material to be discharged.

It would pay you, therefore, to make use of our experience and to consult us on your particular problem.

Send for relevant details and information sheet.

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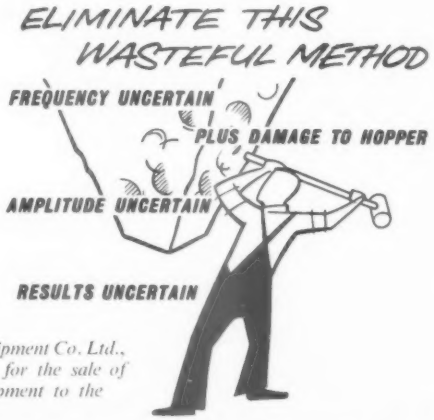

Foundry & Metallurgical Equipment Co. Ltd., have been appointed Agents for the sale of Sinex Engineering Co. Equipment to the Foundry industry.

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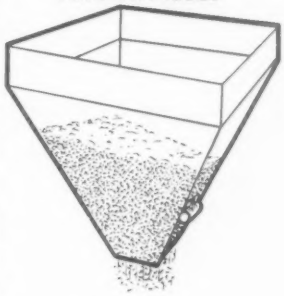
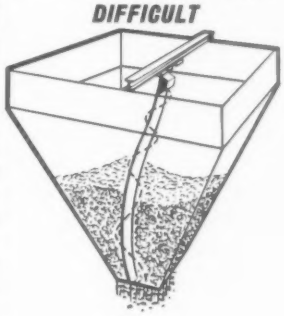


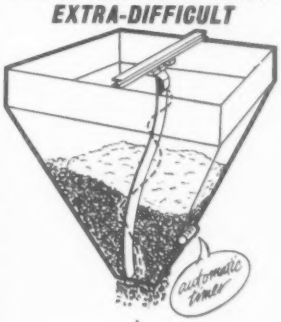
The installation of an external vibrator to a steel hopper.

DIFFICULT



The vibrating reed for application where external vibration is impractical due to structural or other difficulties and if the bunker is made of concrete.

EXTRA-DIFFICULT



A combination of internal and external bunker vibration. Where the external vibrator is timed for 'on and off', the vibration frequency, on slowing down, goes through the natural resonance of the bunker, irrespective of load material contained.

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Bunker clearance Equipment

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SKLENAR furnaces give quick melts 500 lb. brass in 35 minutes) with low metal losses (maximum under 2 per cent.). Finger-tip control of atmosphere for melting non-ferrous metals is standard.

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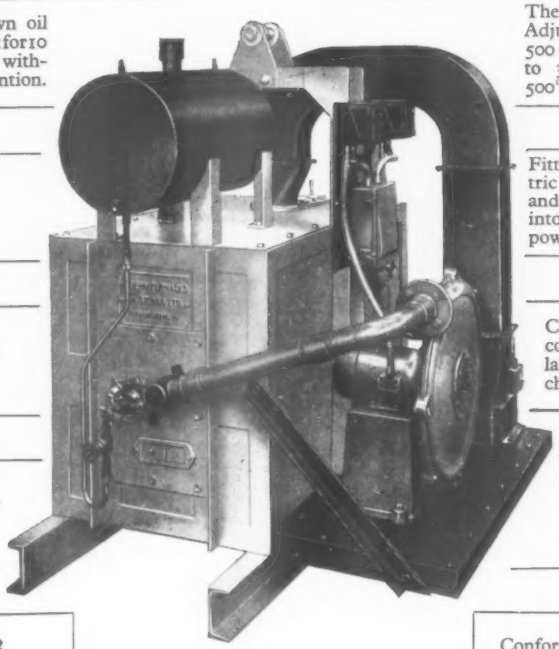

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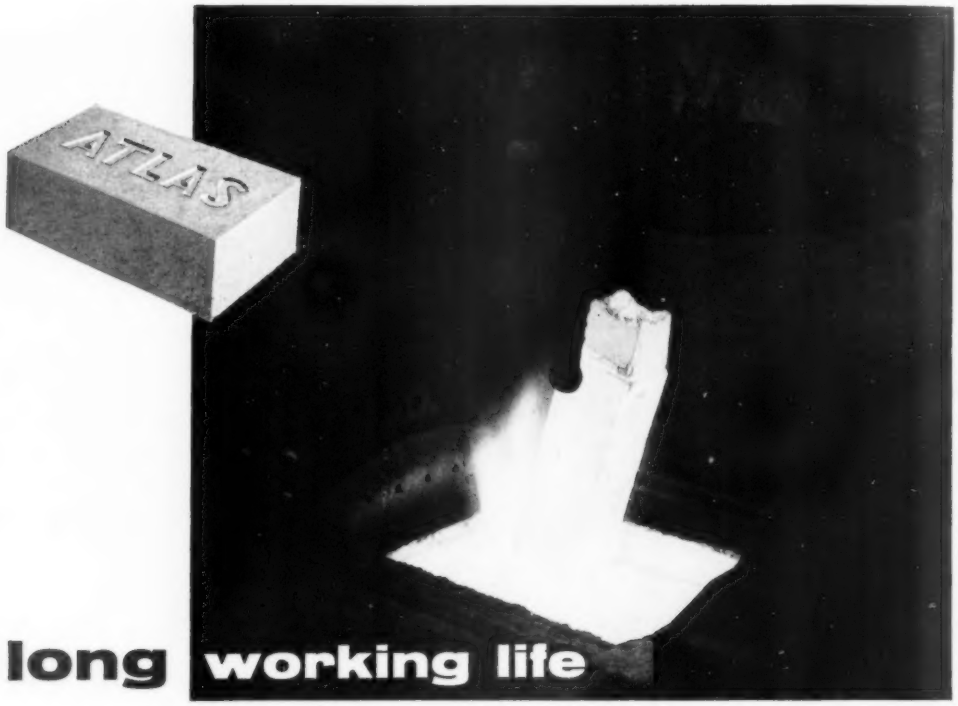

long working life

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the essential quality of a refractory—
the ability to resist spalling and slag attack and the
capacity to carry the load at high temperatures and to
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That is the measure of ATLAS firebricks.
When next considering refractories remember that ATLAS
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ATLAS Firebricks (37/39% Alumina)
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ATLAS and **SARCO** Refractory Cements
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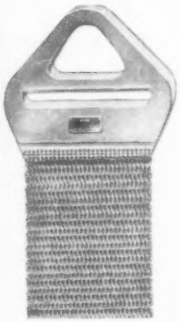

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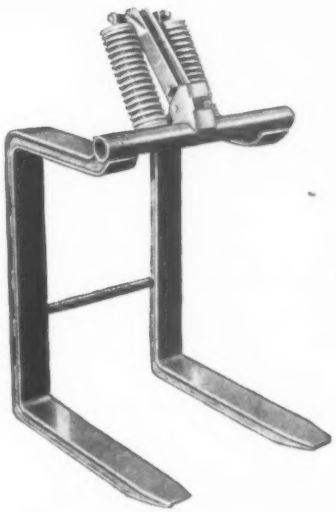
" TEMPLEWOOD "

SPRING-BALANCED CRANE FORK



A new concept in mechanical handling—faster —safer and more manœuvrable. Replaces chains and ' C ' frames. Can be used in gangways too narrow for fork-lift trucks; this means an increase of storage space of up to 50 per cent. The ' Templewood " Crane Fork can be supplied of suitable capacity and dimensions for your particular load.

Write for full details to the Sole Concessionaires.

SOLE CONCESSIONAIRES:

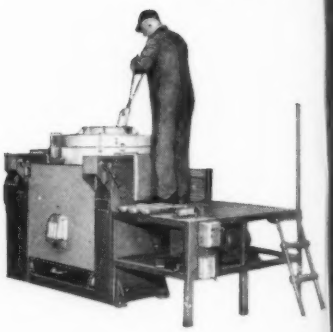
FELCO HOISTS LTD., 29 CROMWELL RD., SOUTH KENSINGTON, LONDON, S.W.7

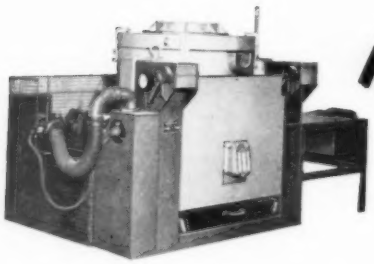
'Phone: KENSINGTON 7401 (3 lines) 'Grams: ' FELCOHOIST,' WESPHONE, LONDON

FB 60

CHARGE

From the table high platform, into the open top basin, with bulky scrap or ingots.





MELT

By supercharge pre-heating, with an unusually high thermal efficiency, and unusually low metal loss.

POUR

With automatic finger tip control of lip axis pouring enabling transfer ladles to be kept in one position throughout the pour. Metal can also be poured direct into Bale-out furnaces.

. . . so much, so good, so cheaply

with

MORGANS

NEW BULK MELTER — THE

Oil or Gas-fired

BASIN TILTING FURNACE

2 crucible sizes take 380 lb Al. (1100 lb bronze) or 500 lb Al. (1500 lb bronze); rapid melting without contamination or inclusions, giving minimum rejects; low crucible cost; a high melting rate with fuel costs down to 27/- per ton aluminium, 22/- brass or phosphor bronze.

Visit the Battersea Test Foundry, or send for leaflet FD 33 to

THE MORGAN CRUCIBLE COMPANY LIMITED

Wandsworth Works · Point Pleasant · London S.W.18 · Tel. VANdyke 6422

F.51A

1960

G

Part
jig-
perf
R L

accuracy

Parting faces ground level and true. . . holes jig-drilled to ensure that pins and pin centres are perfectly aligned . . . all adding up to Accuracy.

Sterling

STERLING FOUNDRY SPECIALTIES LTD., BEDFORD, ENGLAND

Modern carving of a sow and litter in All Saints Church, Beighton. Photograph by Ruth Meyler & F. C. Sillar

50 MILLION PIGS GO TO MARKET!

In the early days of the industrial revolution manufacturers frequently looked for familiar and easily recognisable descriptions of their products. To the countryman transplanted into industrial surroundings nothing was more familiar than a pig; a fact which is emphasised by carvings in scores of old churches depicting pigs suckling their litter, rooting for acorns and playing the bagpipes. (Apparently this last pastime was forsworn by pigs many years ago because of unpleasant associations between bagpipes and pigs bladders.) Consequently, when from Blast Furnaces was directed into long trough from there into short and narrow troughs placed at angles, a resemblance to sows suckling their apper litter led to the description of 'pig iron'.

This series of advertisements illustrates some 'ecclesiastical' pigs and emphasises the 50,000,000 's pigs which Warner and Company have supplied t Foundries producing High Duty Castings.

WARNER WARNER WARNER

"Pioneers of Refined Pig Iron"

KA

WARNER & CO. LTD., MIDDLESBROUGH

With the Centriblast Airless
Rotary Barrel Blast Cleaning Machine
ONE OPERATOR CAN

CLEAN

ONE TON OF MISCELLANEOUS CASTINGS
in one hour

If you require to clean any type of casting we have a machine for you.

Centriblast Airless Rotary Barrel Blast Cleaning Machine

CENTRIBLAST

SPENCER & HALSTEAD LTD. OSSETT YORKSHIRE
TEL: 821-4 GRAMS: SPENSTEAD OSSETT

Powney S.22

FOCUS ON 'FULBOND' N° 9

FULBOND
in organically bonded core sands

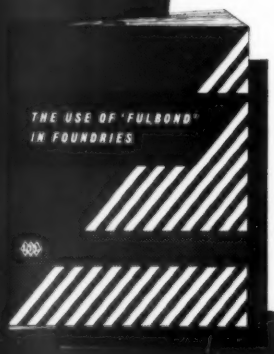
FULBOND will not replace the organic binders normally used in core sand mixes, but is very useful for increasing green strength and maintaining dimensional stability before baking.

A small addition of FULBOND is equivalent to a much greater quantity of natural sand for increasing green strength and has the advantage of not reducing permeability. It is also a much cheaper method of imparting green strength than by increasing the organic binders.

FULBOND is used extensively in the preparation of steel foundry core sands, where a high green strength is essential for some of the large hand rammed cores. The emulsifying effect of FULBOND in oil and cereal bonded cores promotes adhesion of the sand to core irons during ramming up.

FULBOND also improves the deformation properties of the sand at elevated temperatures and helps to prevent contraction cracks during solidification of the castings.

Either grade of FULBOND can be used for core sands depending on the tensile and transverse properties required. The physical characteristics of the base sand and the type of organic binders help to determine which grade should be used.



For a copy of this Brochure please write to:-

THE FULLERS' EARTH UNION LIMITED

Patteson Court, Nutfield Road, Redhill, Surrey

A member of the Laporte Group of Companies

CMF64

STEIN *Refractories*

NETTLE D—first choice for all applications where service conditions are severe. Nettle D has all the desirable properties looked for in a super duty quality and is designed to give maximum service in furnace positions involving high sustained temperatures, severe slag attack, and abrasion.

The use of Nettle D in vital furnace positions means longer furnace life, fewer shutdowns and consequent greater output.

- 43% Alumina.
- Low in fluxing impurities.
- High Refractoriness.
- High under load strength.
- Low Porosity.
- High Bulk Density.
- Low After Contraction.
- High slagging resistance.
- High mechanical strength.

Technical Data Sheet gladly sent on request

JOHN G. STEIN & CO. LTD. Bonnybridge, Scotland

TELEPHONE BANKNOCK 257 (3 LINES)

Modern Foundry practice demands

Cupola

LININGS

of high-grade and dependable quality

SPECIAL "LUMEN" QUALITY
39/40% ALUMINA
A PROVED SUCCESS IN MELTING ZONES

BEST STOURBRIDGE FIREBRICK QUALITY FOR
STACK LININGS

HIGH ALUMINA REFRACTORIES
INSULATING REFRACTORY BRICKS AND SHAPES, AIR SETTING REFRACTORY CEMENTS, ETC.

LARGE STOCKS OF CUPOLA LINING BRICKS AND BLOCKS AVAILABLE FOR QUICK DELIVERY

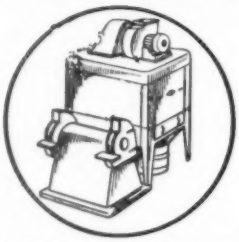
You can rely on Refractories supplied by :

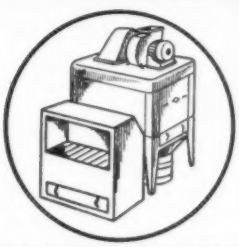
HARRIS & PEARSON LTD., STOURBRIDGE

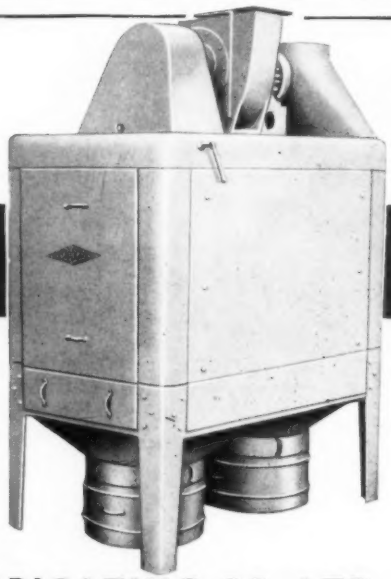
Telephone : Brierley Hill 77281-2

DUST EXTRACTION PLANTS · PNEUMATIC SAND CONVEYING · WOOD REFUSE COLLECTION · FUME & VENTILATION PLANTS
FLOODGATE

FLOODGATE SCREEN TYPE DUST COLLECTING UNITS

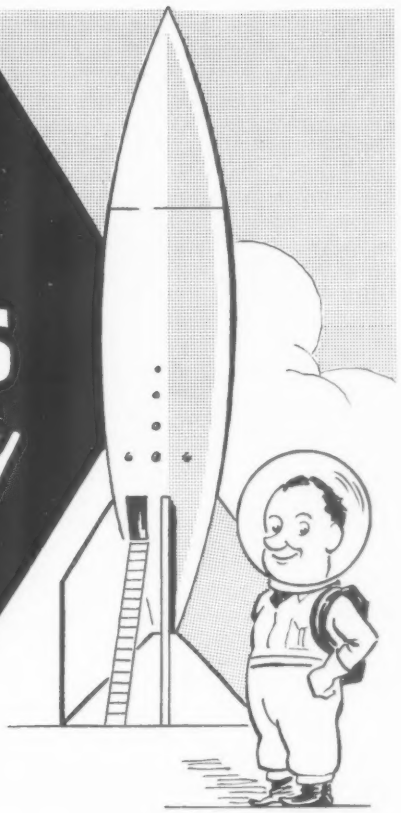






THE FLOODGATE STEEL FABRICATING CO. LTD.
758-786 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM, 24
Telephone ERDington 6111/5
DUST & FUME EXTRACTION · WET & DRY TYPE DUST COLLECTORS · WOOD REFUSE PLANT
MANUFACTURERS OF ALL TYPES OF DUCTING

Go-ahead FOUNDRY EXECUTIVES who look confidently to the future...



rely on

"Baltiseed"

FOUNDRY PRODUCTS

To reach greater heights of perfection in castings depends very largely on the choice of the right Sand Binder for the job.
In the " Baltiseed " range, you will find the exact binder you need for your particular requirement—to produce the best castings at lowest cost.
Our technically trained representatives are available ALWAYS to help with your sand-bonding problems. They will demonstrate—in YOUR OWN FOUNDRY! the ideal method and materials to meet the case.
Contact us to-day—

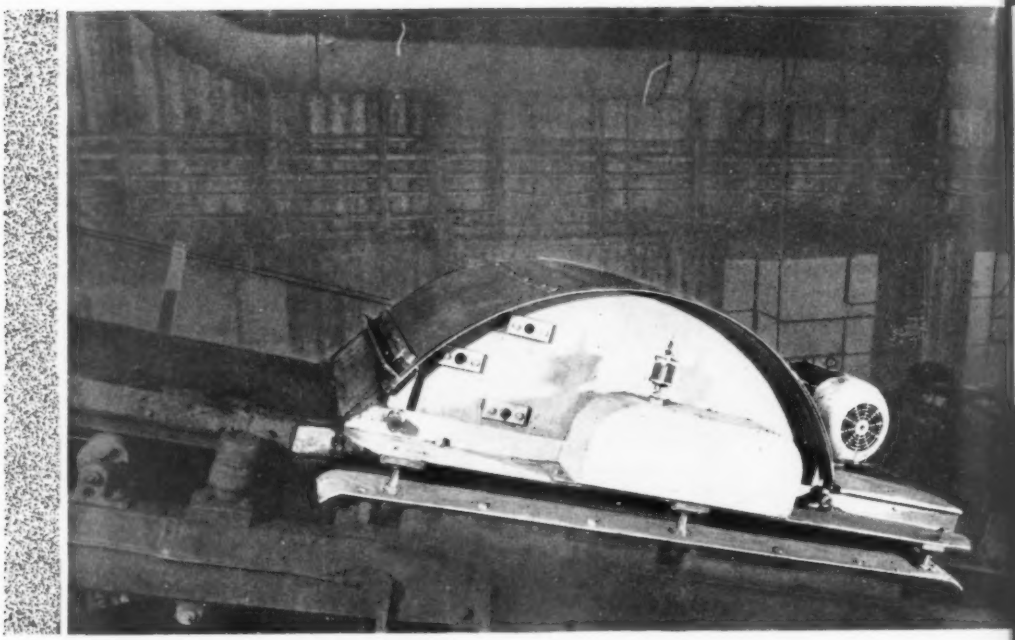
Wm. ASKE & Co. Ltd

VICTORIA WORKS · WATERSIDE · HALIFAX

Telephone: Halifax 60661/2 **Telegrams: Baltiseed, Halifax**

Announcing the C.B.M

PROVED · PRACTICAL · PRICE CONSCIOUS!



First introduced at the American Foundry Show, Cleveland, in 1958, several of these Aerators have been tried out in various foundries and now we offer them to *you!* We have always been able to offer an efficient Aerator or Disintegrator for any capacity. Now the C.B.M. has arrived !
The C.B.M. Aerator, for which British and Overseas Patents are pending, has these features—

- **Available for any hourly sand capacity up to 100 tons per hour.**
- **Suitable for mounting over any width of flat belt conveyor.**
- **Can be incorporated in plants of our own design or in any plant, by anybody, anywhere.**
- **Can be used in new or existing installations.**
- **All you need is a flat rubber conveyor belt on the distribution side of the Sand Plant.**
- **Can easily and quickly be fitted with adjustable brackets or fixings.**
- **No independent supporting structure, platform or chutes needed—just mount it over a flat belt, inclined or parallel to floor level.**
- **No noise, jolting or vibration.**
- **Saves cost of additional supporting steelwork.**

FE FOR FOUNDRY EFFICIENCY TRADE MARK

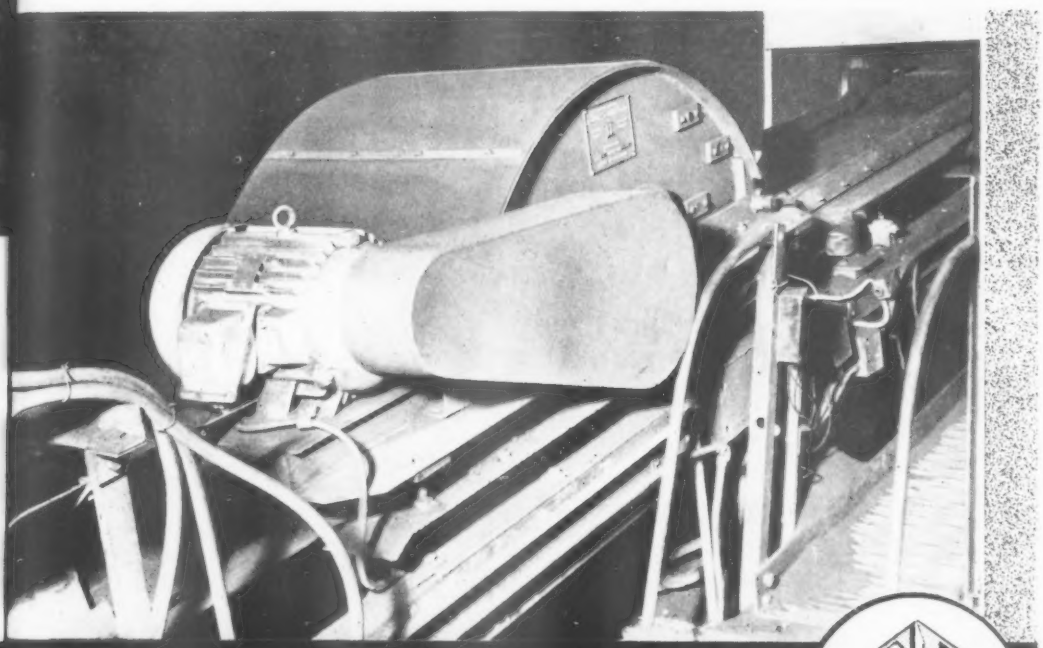
FOUNDRY EQUIPMENT
LIMITED
Leighton Buzzard, Bedfordshire, England
Telephone : Leighton Buzzard 2441 (5 lines) Telegrams : 'Equipment,' Leighton Buzzard, England

AERATOR...

The newest idea in Sand Aeration

- **Saves Elevator height and ideal for low headroom installations.**
- **C.B.M. is lower priced than other Aerators or Disintegrators.**
- **Can be installed in a few hours—cuts erection costs and does not interfere with production.**
- **Single low-powered electric motor drive—5 to 7½ h.p. is usually ample, even for high outputs.**
- **Vee rope drive and fully lubricated chain drive to twin paddles of special patented design.**
- **Machine is fully guarded.**
- **Quickly removable rubber cover for cleanliness, inspection and maintenance.**
- **Reduced maintenance—no pins to replace.**
- **Produces fully aerated "silky" sand for distribution to moulding lines.**

* *One of our clients already has four C.B.M. Aerators in their foundry plant—why don't you try one? All we want is a drawing of existing belt conveyor, decking and platform, and confirmed belt width and speed and maximum hourly sand output—we can give you a quick quotation and short dependable delivery.*



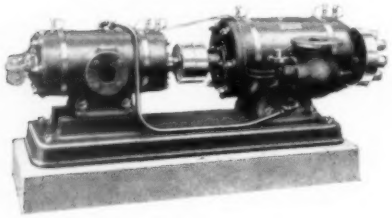
OVERSEAS COMPANIES:
AUSTRALIA: Foundry Equipment (Australia) Pty. Ltd., Elizabeth, S. Australia.
CANADA & U.S.A.: F. E. (North America) Ltd., Toronto.
SOUTH AFRICA: F. E. (South Africa) (Pty) Ltd., Johannesburg.
SPAIN: "Foundry Equipment" Comercial Española. S.A., Madrid.
AGENTS IN ALL INDUSTRIAL COUNTRIES

FE
FOR FOUNDRY EFFICIENCY
TRADE MARK

Belliss & Morcom Ltd

makers of
THE
WORLD'S
BEST
COMPRESSORS
offer a complete range

Rotary Compressors, Vacuum Pumps, Boosters
100 to 1,000 c.f.m. to 110 p.s.i.g.
Vacua to 29·7" h.g.
Standard Reciprocating Compressors
500 to 6,000 c.f.m. to 120 p.s.i.g.
High Pressure Compressors
up to 50,000 p.s.i.g.



Belliss & Morcom Ltd. are prepared to design and build COMPRESSORS and VACUUM PUMPS to meet special requirements and to manufacture machinery to CUSTOMER'S OWN DESIGNS

"Have it 'Belliss' Built"

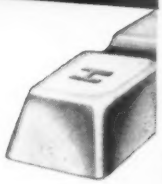
Belliss & Morcom Ltd
BIRMINGHAM 16 · ENGLAND

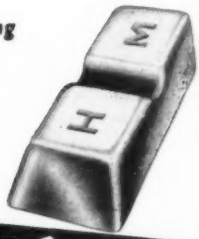
London Office: 25, Victoria Street, S.W.1.

STEAM TURBINES · AIR COMPRESSORS
VACUUM PUMPS · DIESEL & DUAL FUEL
ENGINES · STEAM ENGINES · CONDENSING
PLANTS · 'ARCA' AUTOMATIC REGULATORS

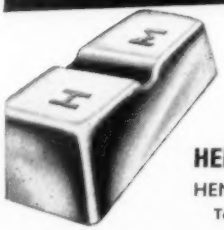
Sound CASTINGS

. . . can only be produced from Quality Ingots. Years of research, development and casting technique go into the manufacture of . . .





HENEAGE Ingots



IN BRASS
GUN-METAL
& PHOSPHOR-
BRONZE

HENEAGE METALS LTD.
HENEAGE ST., · BIRMINGHAM 7
Telephone: ASTon Cross 1177/8

WRITE YOUR OWN RELIABILITY INSURANCE HERE...

Wherever metals are being cast, forged, or fabricated, the important factor of reliability can be assured by specifying R_xMet brand alloys. Whether we ship shot for making castings, billets for forging, or special welding rod, the R_xMet label on the alloy means more consistent performance in the finished product.

At WaiMet, metallurgical reliability and quality control are more than words—they are integral parts of a dedicated approach to making better alloys. We dig a little deeper than most to find out why an alloy behaves as it does, then define new limits of chemistry to guide the production of every heat. Result: alloys with better, more reproducible mechanical properties.

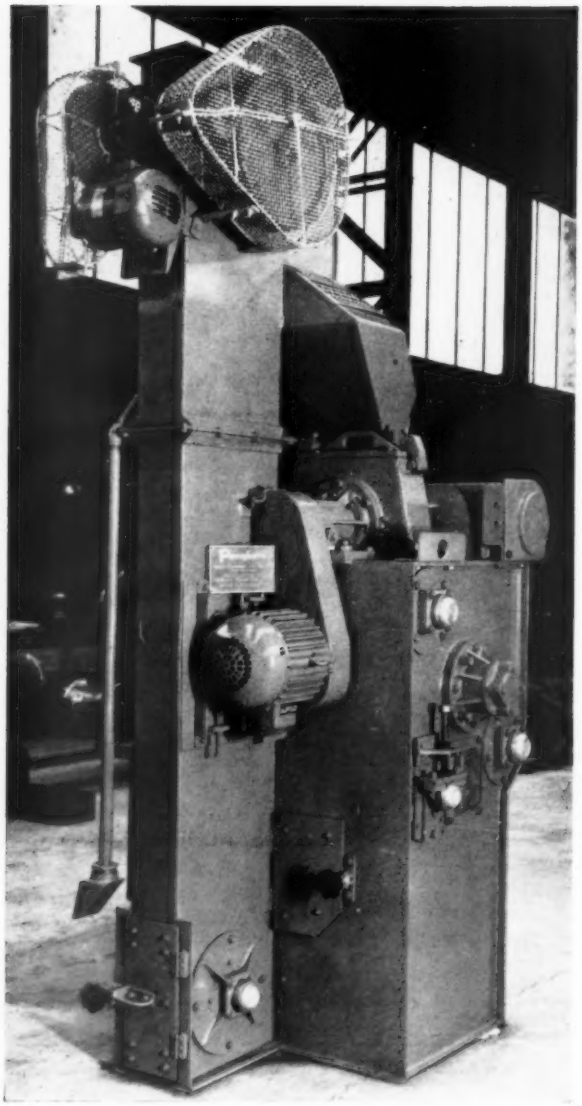
In almost every alloy we make there is some WaiMet improvement in processing or heat treatment technology that will mean better reliability insurance for the user.

HERE ARE TYPICAL REASONS WHY ALLOY USERS SPECIFY R_x MET®

USER OF:	SPECIFIES IT FOR:	USES R_xMET BECAUSE:
410	Aircraft wing hinge	Cleaner melting and tailored chemical composition.
WI-52	Gas turbine blades and vanes	Greatly improved high temperature strength
17-4PH	Gas turbine compressor blades	Uniformly high level mechanical properties
SUPER 3	Agricultural equipment twine guide	Superior wear resistance at low metal cost.

WAI MET ALLOYS CO.
5320 OAKMAN BLVD.
DEARBORN 2, MICH.
U.S.A.
TOOL STEELS • STAINLESS STEELS
SUPERALLOYS • VACUUM-MELTED ALLOYS

Put WaiMet's technical team to work for you at the design stage. Specify R_xMet whenever reliability is important in stainless, heat resistant alloys, or superalloys. For information on the R_xMet alloy line, just drop us a line.



1½ CUB. FT.

"Panqborn"

ROTOBLAST BARREL

●

COMPLETE TESTED AND READY FOR PACKING

●

Destination AUSTRALIA

●

AVAILABLE IN SIZES UP TO

72 CUB. FEET CAPACITY

HEPBURN CONVEYOR CO. LTD.

WAKEFIELD

, 1960

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FAMOUS SINCE 1844

G. & R. THOMAS LTD

PIG IRON

for

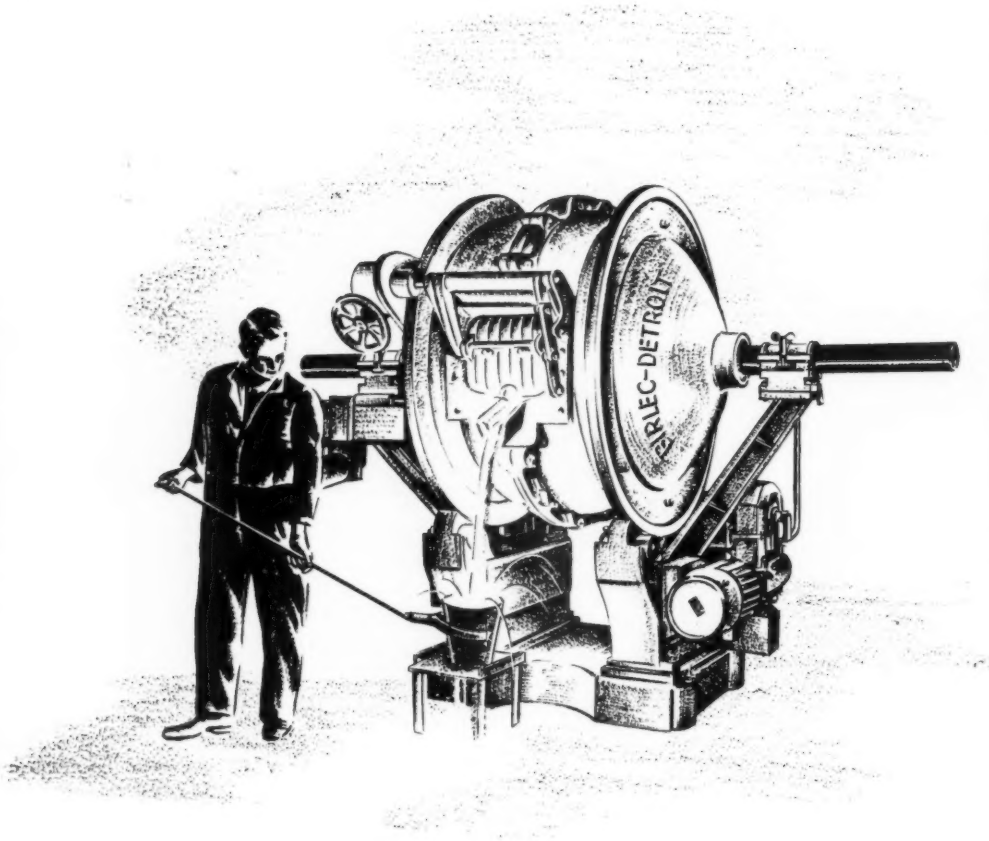
CYLINDER AND HIGH DUTY CASTINGS

The perfect pig-iron for cylinder and high duty castings . . . free from porosity and of high tensile strength. Our Technical Staff is always ready to assist users and to advise with regard to mixtures. We cordially welcome your enquiries.

GRADES OF IRON AVAILABLE — **For Chilled & Hard Iron Castings**

HATHERTON FURNACES BLOXWICH Nr. WALSALL STAFFS.

TELEPHONE:- BLOXWICH 76348/9 TELEGRAMS:- THOMAS BLOXWICH.



ROCKING ARCS

The intense heat of an electric arc is put to excellent purpose in the versatile Rocking Arc Furnace which is so popular in modern foundries. To carry the arc and withstand the exceedingly high temperature demands an exceptional combination of strength, conductivity and refractory properties — in fact only an 'ACHESON' graphite electrode is good enough. There is a size for every furnace.

ACHESON

TRADE MARK

GRAPHITE ELECTRODES

The term 'ACHESON' is a registered trade mark

BRITISH ACHESON ELECTRODES · WINCOBANK · SHEFFIELD · PHONE SHEFFIELD 348831

FOXBORO

Foundry Instrumentation

Weigh all the air

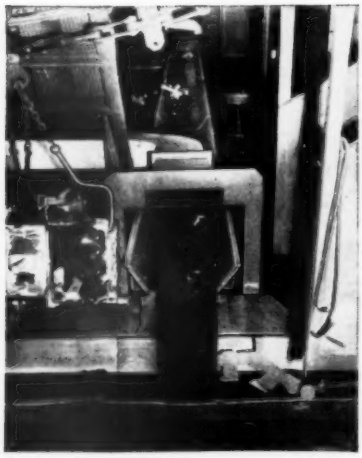
THE FOXBORO AIR WEIGHT CONTROL SYSTEM is specially developed to provide the Foundry Industry with Uniform Cupola Control. This completely Automatic System controls the weight of Air delivered to the Cupola, reduces fuel consumption and makes possible :—

UNIFORM HEATING
BETTER POURING
HIGHER QUALITY CASTINGS

In addition, Foxboro Systems are available for measuring, recording or controlling — Pressure, Humidity, Dewpoint, Temperature and many other variables.

FOXBORO-YOXALL LIMITED

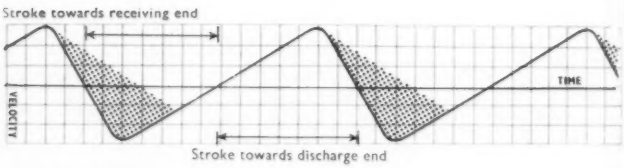
REDHILL • SURREY • ENGLAND



Shaker conveyor discharging scrap on to a similar conveyor. (The photographs reproduced in this advertisement are published by courtesy of Ford Motor Company Limited.)

Sand cores and risers from engine component castings fall on to a shaker conveyor which carries them to a rotary scrap breaker and sand separator.

Shaker conveyor showing type G 20 drive, driven by a 20 h.p. flywheel motor; this robust drive delivers high peaks of energy.



SHAKER CONVEYING

in a mechanised foundry

The Distington-Goodman shaker conveyor is not a jigger conveyor. Its troughs move in only one plane on ball-bearing rollers and propel material by variations in their rates of acceleration and deceleration (these are shown in the time-velocity curve above: the shaded areas represent the movement of material independent from the movement of the troughs).

Distington-Goodman shaker conveyors have been used for many years for loading and conveying coal and rock. Their robust all-steel construction makes them ideal for handling hot materials in foundries and cement clinker and sinter.

They are easily extended and contracted and can be made self-loading from stock heaps. Lines of troughing can be made to deviate through angles up to 90°. Conveying capacity depends upon several factors but would normally exceed 60 t.p.h. on the level.

DISTINGTON ENGINEERING COMPANY LIMITED

WORKINGTON · CUMBERLAND · ENGLAND

DISTINGTON

DB.21

Atlas by kind permission of William Collins Sons & Co. Ltd.

Dependable

the world over

CONVENTIONAL COREBINDERS

Glyso Core Compounds
Permol Core Oils
X.L. & Exol Cereal Binders
Airbond

COLD SETTING BINDERS

Corovit
Heavy Corovit

SHELL PROCESS PRODUCTS

Phenolic Coating Resins 726, 728, 526
Plastsand Coated Sands

EQUIPMENT

Fordath Complete Shell Sand Coating Units
Fordath Shell Moulding Units
Fordath Core Sand Mixers
Fordath Core Extrusion Machines
Fordath Rotary Sand Driers and Coolers
Corall Coreblowing Machines

FORDATH

THE FORDATH ENGINEERING CO. LTD., BRANDON WAY WEST BROMWICH, STAFFS.
Telephone: WESt Bromwich 1665 (4 lines) Telegrams: Metallical, West Bromwich FO2348

Your COREMAKING with the NEW

ATMOSOL

CORE OIL

Cores harden in Core Box. & handle readily.
Final Baking 30 minutes at 200 C.
Produces Cores with High Tensile Strength
Quick and Easy Breakdown
Excellent Skin Finish

For further details ask for our booklet No. 2

BRITISH FOUNDRY UNITS LTD.

FOR THE ONLY COMPLETE SERVICE TO THE FOUNDRY.

RETORT WORKS

CHESTERFIELD

Telephone 4157/8 2 lines *Telegrams: Retort*

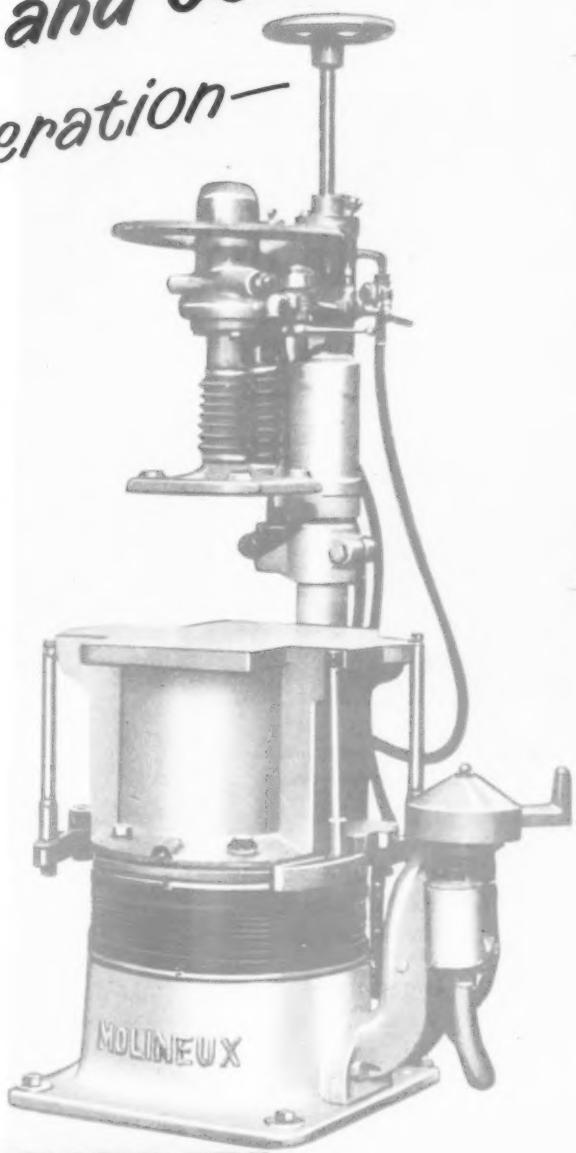
Squeezes and Jolts in one operation—

Top quality moulds—each of consistent density—are easier to produce on the MOLINEUX Moulding Machine. Sturdily built for long life and precision in operation, this machine cuts operating times by squeezing and jolting in one operation.

Cuts operating times—
improves mould quality

MOLINEUX MOULDING MACHINE

for the deep difficult job



MOLINEUX

Write for full specification and prices to:
Molineux Foundry Equipment Ltd.,
Marlborough Works, Marlborough Rd., London, N.19
Phone: ARChway 4127

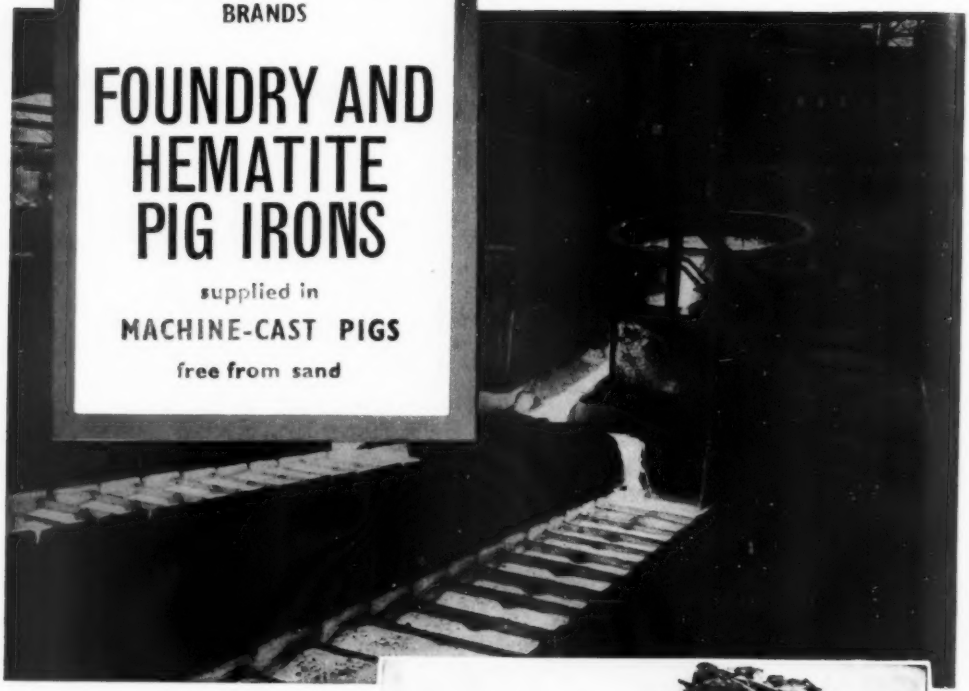
GARTSHERRIE & EGLINTON BRANDS

FOUNDRY AND HEMATITE PIG IRONS

supplied in

MACHINE-CAST PIGS

free from sand



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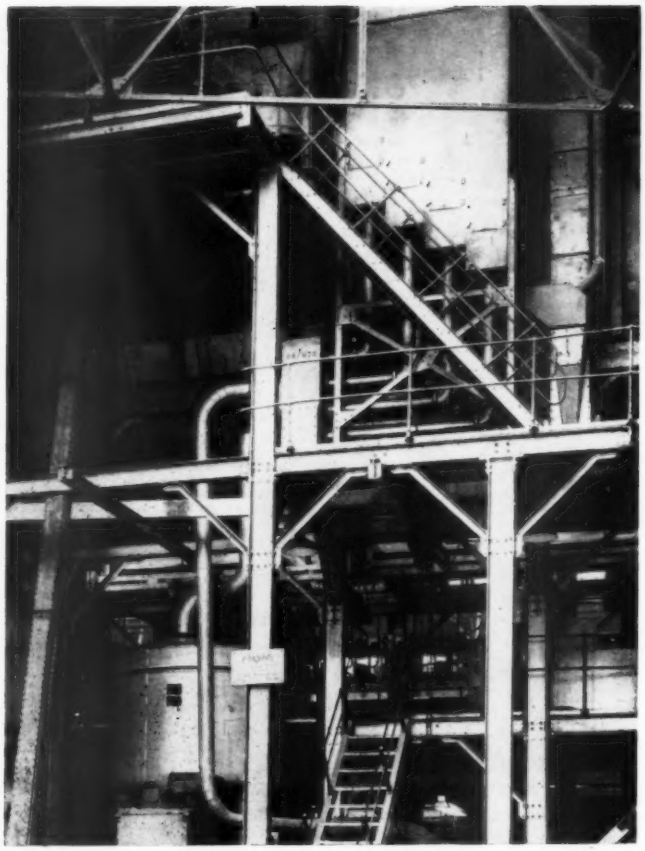
NEW SAND FOR OLD.. with the AUGUST-NATIONAL Sand recovery system



Photograph shows a compact arrangement of a sand recovery, storage, and mixing unit. Sand from the knock-out is charged to the August National Sand Scrubber (pneumatic reclamation) by means of a hopper with rotary table feeder. The reclaimed Sand is discharged into a bucket elevator which loads a storage hopper. A large 3F size Mix-Muller (batch capacity 4,000 lbs.) shown in the foreground, receives sand from this storage hopper, together with sand and additives from other hoppers, by means of an overhead travelling batch measurer with weighing device.

Photograph published by courtesy of Messrs. Catton & Co. Ltd., Leeds.

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TRADE JOURNAL

Vol. 109 August 18, 1960 No. 2280

New Threat to Stability

The Press has been giving warnings that a fresh increase in the price of coal is imminent. On the last occasion when an increase was in the offing, the JOURNAL carried a leading article entitled " Addition or Multiplication " because we were (and still are) firmly of the opinion that this is the most obnoxious of all increases in the cost of raw materials. Only momentarily is it a straight price increase, for quickly it is followed by increases in the cost of electricity, coke, pig-iron, scrap, transport and finally, in the cost of living itself. Unfortunately, too, such an inflationary spiral bears more quickly and more heavily on the ferrous foundry industry than most other industries.

It was suggested on the earlier occasion and is repeated now—that though against State subsidies, we feel that if the increased cost of coal were absorbed by a subsidy, and through taxation, the population would then pay for the root-cause of the increase in the pit-head cost of coal, and would pay but once. An increase in the selling price of fuel is the beginning of a " snowball," the ultimate outcome of which is anybody's guess. Usually, it is the forerunner of a second inflationary trend. Thus one could envisage a new pound, as was the case with the franc.

The writer has discussed this subject with a few members of Parliament, but they have stressed the idea that if a subsidy were given to coal, then all the other State monopolies would require similar treatment. This argument is difficult to follow, as a stable price of fuel would create conditions helpful to the economic exploitation of both the gas and electricity undertakings. The giving of subsidies may be contrary to the ideas of certain economists—to whose theories we are inclined in general to subscribe—but in the case of this basic commodity, coal, a subsidy would seem to be the only remedy possible in order to retain stability for this country's industries. Stability is an essential basis for building the whole prosperity of any country.

British Foundry Medal and Prize

The British Foundry Medal and Prize for 1960, which were awarded by the Institute of British Foundrymen to Mr. George McNair but which, on account of illness, he was unable to receive at the recent IBF conference in Malvern were presented to him in person last month. The presentation was made by Mr. John Scott, managing director of the Fullwood Foundry Company Limited, at a complimentary luncheon given by the company in honour of Mr. McNair.

Also present at the luncheon were Mr. George Greig, works director of the company and a number of the senior members of the staff. The Institute was represented by Mr. John Bell, past-president and Mr. A. Marshall, hon. secretary of the Scottish branch. Mr. Scott put forward apologies from Mr. W. Barr, chairman of the company and from Mr. T. J. Smith who, with Mr. Barr, is a director of the parent company, Colvilles, Limited.

Mr. John Scott (right), managing director of Fullwood Foundry Company, Limited, handing over the IBF British Foundry Medal award to Mr. George D. McNair.

Before the presentation Mr. Bell gave a brief resumé of the work of the Institute and its various awards* and Mr. Marshall referred to Mr. McNair's advance in the industry since, in the early days of the last war, he had travelled 25 miles in the evening blackout regularly to attend classes at the Stow College of Engineering, in Glasgow.

Mr. McNair, who is foundry manager of the Company's Hamilton Foundry, suitably responded and thanked Mr. Scott and his co-directors for the arrangements they had made for the presentation.

* The "British Foundry Medal and Prize" award is presented annually by the Institute, from funds donated by the FOUNDRY TRADE JOURNAL, to the Author of the best paper presented to the IBF during the year. It was awarded to Mr. McNair for his paper entitled "Increasing Efficiency in the Steel Foundry."

HALL, RUSSELL & COMPANY, LIMITED, Aberdeen, have received an order to build a cargo motorship of 7,500 tons dw. for the Burnett Steamship Company, Newcastle. The order follows the completion of the Holmside, a similar vessel for the same owners.

Retirement of Dr. Hudson

Dr. J. C. Hudson, D.SC., D.I.C., A.R.C.S., F.I.M., who has been in charge of the British Iron and Steel Research Association's research on corrosion for the last 15 years—ever since the formation of the Association in 1945—will be retiring at the end of this month. He has, however, agreed to act as consultant to both the corrosion advice bureau and the chemistry department. Dr. Hudson's first appointment was with the atmospheric corrosion sub-committee of the British Non-Ferrous Metals Research Association. Then, in 1929, he became investigator to the newly-formed corrosion committee of the Iron and Steel Institute, since taken over by BISRA.

Dr. Hudson has published well over 100 papers, and two books, "Corrosion of Iron and Steel" and "Protective Painting of Structural Steel" (the latter in collaboration with Mr. F. Fancutt, M.B.E.).

Latest Foundry Statistics

Steel Castings: The *Bulletin* published by the Iron and Steel Board and the British Iron and Steel Federation states that employment in steel foundries as registered on June 4 was 17,990. This shows an increase of 210 over the May 7 return and 660 over a year ago. The estimated average weekly production of steel castings during June was 5,700 tons against 6,000 tons in May.

Light-alloy Castings: The Ministry of Supply reporting on the May production of aluminium-alloy castings announces that the total output was 9,658 tons, of which 1,807 tons was from sand moulds; 5,395 tons as gravity-die and 2,456 as pressure-die-castings. For the first five months of this year, the total output has reached 46,098 tons, which represents a continuous high production. The production of magnesium in May attained 192 tons which is an improvement on the monthly average.

Ironfounding: The Council of Ironfoundry Association states that a total of 129,549 were employed in iron foundries in the United Kingdom during the week ending May 28. This is a slight increase on the figure for the previous month, but 6,103 more than

---

Canadian Foundry Conference

The Eastern Canada Chapter of the American Foundrymen's Society has organized an all-Canadian conference which will be held at the Sheraton-Mount Royal Hotel, Montreal, on October 27 and 28. Works visits have been arranged for the mornings of the two days, including a visit to a completely-automated plant for the production of steel wheels. In the afternoons, technical sessions will be held for the discussion of 17 papers. On the social side, luncheons and dinners will be held, and a separate programme for ladies has been arranged.

Founders wishing to participate should write to the chairman of the Conference, Mr. M. Reading, 46 Devon Road, Kensington Gardens, Beaconsfield, P.Q., Canada.

BRITISH GOVERNMENT has agreed in principle to provide loan finance for the extension of the Durgapur steel plant to enable it to increase its capacity by 600,000 tons annually. The foreign exchange component for the extension is placed at £20,000,000. The UK High Commission and the Indian Government are now discussing the details.

Non-ferrous Reverberatory Furnace*

By E. Ayres and W. B. Lawrie, M.B.E., M.Sc., F.R.M.S., A.I.M.†

This article describes the latest stage in a series of research and development projects which were undertaken in an effort to control the thermal environment in non-ferrous foundries. Experimental work has now been completed on a third reverberatory furnace designed to melt aluminium. The new furnace operates at a fuel efficiency of about 44 per cent. and melts 16.7 lb. of aluminium per minute to a temperature of about 700 deg. C., giving 152 lb. of molten metal per gallon of oil burned.

A good deal of thought has been given in recent years to the improvement of conditions in non-ferrous foundries[1, 2] and the possibility of controlling the thermal environment has, in consequence, received some attention. It is well known that working conditions may become extremely hot and unpleasant in non-ferrous foundries if the weather is warm. Early work was, therefore, directed to the measurement of this temperature increment[3, 4]; to the determination of the cause of the high temperatures[3]; and to the alleviation of the unpleasant conditions they produce[3]. It was shown that furnace insulation was frequently inadequate and that some types of furnaces were inefficient as melting units. In particular, measurements indicated that certain bale-out furnaces operated with a fuel efficiency as low as 13.55 per cent. It was evident that this low operational-efficiency was costly and that it was also partly responsible for bad thermal-conditions. In consequence, an experimental reverberatory furnace was constructed which gave a fuel efficiency of 31.9 per cent.[3] This improvement in efficiency meant a smaller heat-loss and, in consequence, better conditions; it also gave cheaper melting. The use of a reverberatory furnace with the flame playing on to the metal, led at once to questions of metal cleanliness and discussion on fluxing and degassing. Obviously much depends on the alloy melted, the condition of the flame in the furnace and the metal temperature, but it was shown that satisfactory aluminium pressure-die-castings could be made from the metal melted in the furnace. It was also suggested that there were good reasons for believing that fluxing and degassing were unnecessary in the aluminium pressure-die-casting foundry. The furnace therefore helped in the suppression of fume as well as in the control of the thermal environment.

When the 600-lb. prototype furnaces had been working satisfactorily for some time, a second production unit was installed with a capacity of 400 lb. of aluminium. On this occasion, further consideration was given to the refractories. This furnace, which has now completed a production run of two-and-a-half years, was described in a recent publication[5] where it was reported that "working conditions have been vastly improved by the introduction of this type of furnace and a considerable saving in running costs has been achieved."

Meantime, a third furnace has been designed and constructed in order to obtain a still higher fuel-efficiency. When used experimentally as a prototype, this furnace melted aluminium at the rate of 16.7 lb. per minute giving 152.6 lb. of molten metal (at 690 to 700 deg. C.) per gallon of oil with a fuel efficiency of about 44 per cent.

During the course of all this work which was done for the technical sub-committee of the Joint Standing Committee on Safety, Health and Welfare Conditions in Non-Ferrous Foundries, fuel efficiencies have, therefore, been raised progressively from 13 to 32 to 44 per cent. In consequence, the thermal environment in the vicinity of the furnaces has also progressively improved. In those instances in which the matter was investigated, the melting methods have given molten aluminium which could be cast without fluxing or degassing, thus reducing the amount of fume in the foundries.

It has not yet proved possible to use the new furnace for a full-scale production trial, nor has there been time to make all the measurements that are needed to permit of a complete theoretical appraisal of the results achieved. Clearly enough, this should be done, as it doubtless will be, in due course. On the other hand, the work was undertaken for a committee which deals with the practical day-to-day conditions of the foundry and so it was decided to place the facts as they now appear before the industry. It was thought that foundrymen might be interested in a furnace design which will greatly improve the thermal environment, which is cheap in capital cost and which offers fast melting with virtually gas-free metal and a fuel efficiency of about 44 per cent. The purely theoretical work, which should form the basis for further improvements in design, may follow later.

Preliminary Considerations

Before proceeding to the examination of design details, it was decided that the new furnace should be a straightforward reverberatory furnace with one

* It should be pointed out that this type of work on melting of non-ferrous metal is still proceeding and other avenues are being explored. A further paper reporting novel experiments is in course of preparation and will be printed shortly.

† Of the Authors, Mr. Ayres is a director of Millspaugh, Limited, and Mr. Lawrie is H.M. Inspector of Factories, Ministry of Labour.

or more bale-out pools. As the original object was to melt aluminium, it was agreed that the bale-out pools should be outside the furnace body, although if the furnace were to be used for bronze, it was proposed to keep the bale-out pools inside the furnace and under the reverberatory roof. It was also agreed that the furnace should be of simple construction, using rammed or cast refractories or bricks of the normal standard shapes. This would facilitate the construction of the furnace, allow of easy maintenance and repair and give low capital and running costs. It was not anticipated that much maintenance would be needed because one of the earlier furnaces, in which some attention had been given to refractories, had run for two years virtually without repairs[5]. A discussion on burners led to the conclusion that a simple form of burner could be used, but that a balanced burner might well be desirable.

It was accepted as axiomatic that most of the outside surface of the furnace body should be no more than 25 to 50 deg. C. during operation, in order to avoid the unpleasant thermal-environment so often associated in the past with melting furnaces. Quite simply, it was supposed that the object of the experiment was to provide a furnace with a hot interior to melt metal, rather than one with a hot exterior to heat the men and the foundry.

Questions of fluxing and degassing were not seriously discussed in spite of the proposal to use reverberatory melting with the flame playing directly on to the metal. This was because the Authors were satisfied that the amount of gas and impurity picked up by metal during melting, is a function of time. As the main object of the work was to achieve a fast melting-rate, it was assumed that, so long as clean metal was charged, the molten metal would retain its purity; this was later shown to be true. It was appreciated that the melting loss would have to be controlled, but this would obviously be determined in large measure by the state of the flame. Clearly, a balanced or slightly-reducing flame would be needed.

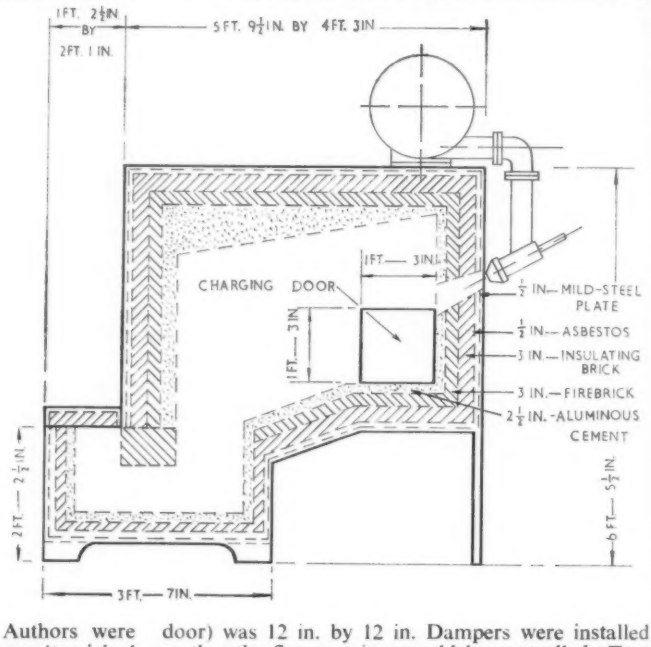


FIG. 1.—*Final form of the reverberatory furnace.*

Furnace Details

The final form of the furnace is shown in Fig. 1, although a tap-hole was provided at the bottom of the bale-out pool. This is not shown in the sketch, but it is always a useful addition to a furnace of this type, even though it may not often be needed. For experimental purposes, the bale-out pool was fitted with a hinged lid, but a production furnace should have a sliding lid operated by a compressed-air ram or by some other suitable mechanical device. The furnace was constructed of the materials that were most easily available at the time, the steel-plate body being insulated with asbestos over which bricks were used before putting in the final lining of aluminous cement. The furnace could be equally well cast *in situ* using a refractory-concrete face over an insulating concrete lining, as was done with the previous one[5].

The prototype furnace was fitted with two flues in the roof, the front one (above the bale-out pool) was 6 in. by 6 in. and the back one (above the burner, but in the corner opposite to the charging door) was 12 in. by 12 in. Dampers were installed so that the flue openings could be controlled. Two low-pressure burners were tried. One of them had a maximum rating of 6 gall. of oil per hour and was used with a fan capable of delivering 20,000 cu. ft. of free air per hour at 16-in. water-gauge. The larger burner had a maximum capacity of 10 gall. of oil per hour and was used with the fan already mentioned and also with a second fan capable of delivering 12,000 cu. ft. of free air per hour at 28-in. water-gauge.

The smaller burner did not immediately give the anticipated results. Because the whole object of the work was to determine good melting practice, rather than to elucidate theoretical considerations, this small burner was discarded without any particular effort being made, either to determine the

reasons for the results obtained or to improve on them. The larger burner was found to be successful with either of the fans, melting slightly more quickly with the second fan aforementioned, but giving much more metal per gall. of oil with the first fan. The specific gravity of the oil burned was 0.89 and its calorific value 19,600 British thermal units per pound.

Aluminium was melted (L.33), but the furnace could not be used on a production run because dies were not available. In consequence, only experimental results can be given. The metal charged was not particularly clean, consisting of scrap with some dross amongst it. After melting, it was run into pig and used again. An attempt was made to determine metal loss through the furnace but the results would be high owing to the fact that clean metal could not be charged. Many tests were made during the work, but the following information indicates the results that were obtained toward the end of the experiments on aluminium. The furnace was used on bronze for bale-out work. The metal was successfully melted in this furnace which had been designed for aluminium, but only preliminary work was done because the furnace had not been constructed for bronze melting.

Experimental Results

It is doubtful if the furnace lining was ever completely dried throughout the experimental work. It was, of course, roughly dried before charging metal and this initial period of drying has been omitted from the results. Thereafter, the furnace was used on many occasions, but never for a full shift. In order to give some indication of the time needed to preheat the furnace, however, observations were made on those occasions on which the furnace was restarted after being empty and shut down for two to three days. This would approximate to a Monday morning start after a weekend off. In these conditions, it was found that, with an empty furnace, one to one-and-a-half hours sufficed to raise the side-wall temperature to 1,060 deg. C., the back-wall temperature to 1,020 deg. C. and the bale-out to 850 deg. C. These temperatures were measured with a disappearing-filament pyrometer.

Fuel Efficiency

The specific heat of a metal varies with temperature, two actual values for the aluminium alloy L.33 being 0.223 at 100 deg. C. and 0.266 at 500 deg. C. The latent heat of aluminium is 167 B.Th.U. per pound, and this means that it would require 455.116 B.Th.U. to heat 1 lb. of the alloy to 700 deg. C. using the lower value for specific heat, or 510.672 B.Th.U. using the higher value. For any but purely scientific purposes it appears that a round figure of 500 B.Th.U. may be taken as the heat required to raise 1 lb. of aluminium to 700 deg. C. and this value will be used here.

In this example, the furnace was fitted with a burner having a rating of 10 gall. of oil per hour, blown by a fan capable of giving 20,000 cu. ft.

FIG. 2.—*Results of the reduced-pressure gas-test carried out by the Authors on samples weighing 250 gm. and poured into a pre-heated metal crucible.*

of free air per hour at 16-in. water-gauge. At the setting used, the burner, in fact, consumed 9 gall. of oil in 82 minutes, *i.e.* Firing Rate $= \frac{9 \times 60}{82}$ gall. per hour. $= 6.58$ gall. per hour.

After having been run since 11.45 a.m., the furnace was emptied at 3.15 p.m. Between 3.28 p.m. and 3.30 p.m., 200 lb. of assorted pig and scrap aluminium were charged and at 3.42 p.m. the whole was melted and at a temperature of 690 to 700 deg. C.

Metal: Heat to melt metal and raise to 700 deg. C. $= 200 \times 500$ B.Th.U. $= 100{,}000$ B.Th.U.

Oil: Firing rate, 6.58 gall. per hr.; time taken, 12 min.; oil used $= \frac{6.58 \times 12 \text{ gall}}{60} =$ $= 1.31$ gall.

Specific gravity $= 0.89$; Calorific value $= 19{,}600$ B.Th.U. per lb.; heat from oil $= 1.31 \times 8.9 \times 19{,}600 = 228{,}516.4$ B.Th.U.

Efficiency: Fuel efficiency $= \frac{100{,}000 \times 100}{228{,}516}$ $= 43.7$ per cent.

Melting Rates

The melting of 200 lb. of metal in 12 minutes with 1.31 gall. of oil gives a melting rate of 16.7 lb. of aluminium per minute and 152.6 lb. of aluminium per gall. of oil.

Metal Loss

The metal loss on this heat was 1.66 per cent. This figure is higher than would be expected in ordinary working-conditions if only because the mixture of pig and scrap that was charged, certainly contained dross, so that there would be some loss of weight as the dross was left behind in the furnace.

Gas Content

On casting, the metal appeared to be gas free. Tests were made at 1-in. and 2-in. pressure on a "Porotec," reduced-pressure gas tester, and the

samples all showed a pronounced "sink." The samples of 250-gm. weight were poured into a pre-heated metal crucible and Fig. 2 is typical of the results obtained.

Conclusions

(1) It has been shown that a reverberatory furnace fitted with a bale-out pool for use on aluminium can be made to work at a fuel efficiency of about 44 per cent. (2) The furnace melted at a rate of 16.7 lb. of aluminium per minute. (3) The furnace melted 152.6 lb. of aluminium per gall. of oil. (4) The molten metal was gas free for all practical purposes. (5) Most of the outside surface of the furnace was cool enough to be touched, so that it made no essential difference to the thermal environment in the foundry. This is merely confirmation of earlier results.

The Authors gratefully acknowledge the assistance given by the directors of Millspaugh, Limited, without which the work could not have been done. One of the Authors, Mr. W. B. Lawrie, is under obligation to T. W. McCullough, O.B.E., HM Chief Inspector of Factories, for permission to engage in the work and is also indebted to H. Woods, HM Deputy Chief Inspector of Factories, for his continued encouragement.

REFERENCES

[1] *First Report of the Joint Standing Committee on Safety, Health and Welfare Conditions in Non-Ferrous Foundries*, H.M. Stationery Office, London, 1957.

[2] *Second Report of the Joint Standing Committee on Safety, Health and Welfare Conditions in Non-Ferrous Foundries*, H.M. Stationery Office, London, 1959.

[3] Turner, D., Lawrie, W. B., Eyden, A., and Edwards, A., "Thermal Environment," *Metal Industry*, May 11 and 18, 1956.

[4] Turner, D., "A Study of the Thermal Environment in Non-Ferrous Foundries," *British Journal of Industrial Medicine*, **14**, 1957.

[5] Hodges, G. A., "Construction of an Oil-fired Reverberatory Furnace for Melting Aluminium," FOUNDRY TRADE JOURNAL, **107**, 2240, November 12, 1959.

Nomogram for Die-casting Faults and their Causes . . . . *By D. J. Saven**

The chart shown below may be of interest to die-casters and help in eliminating some of the process variables which can arise during the manufacture of pressure-die-castings. It is of particular help in the development of new dies, and can also be of assistance to casters in tracing faults which arise during production, causing rejection of castings.

It is known that in all casting processes there are several main factors which can cause rejection; each of these factors may have several contributing variables, some more than others. By separating these factors and allocating the variables of each one the nomogram shows that some faults are likely to occur more frequently because they have a greater number of variables related to them.

* The author is superintendent of casting production in the die-casting department, English Electric Company, Limited, Liverpool.

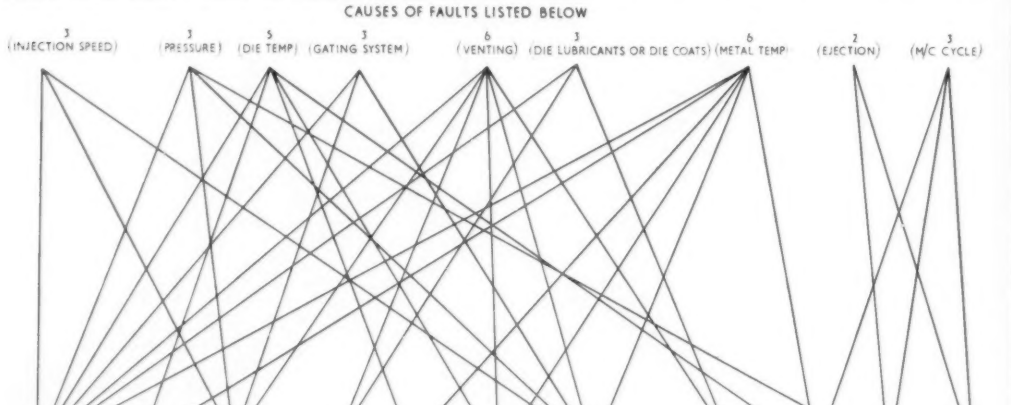


FIG. 1.—*Simple nomogram relating common faults in die-castings, which can be responsible for their rejection, and their causes. Shown at the base are eleven main defects which may cause casting rejection, and the factors contributing to their occurrence. The chart can be used as a guide to separate the variables involved in die-casting into the different categories, and enables one to pinpoint the basic factors which cause a certain type of reject. From the chart it can be seen that the contributing factors 'spotlight' the possibilities of the rate of severity of a particular fault occurring, i.e.:— Misruns have seven contributing factors, and are more likely to occur than cold shuts, which have only two contributing factors. It must be borne in mind that when tracing one these faults, the other variables must be checked to make sure they are within the correct working limits. The chart takes care of commonly known variables and faults (assuming machine and plunger magazine are in working order).*

Foundry Training in Europe

Extracts from the Report of Sub-committee No. 1. of the European Committee of Foundry Associations. . . . by Ludger Frede*

In this report on the activities of the sub-committee on training of the European foundry employers' associations committee, the writer first stresses the value of training and looks to the future when, with the advent of more-exacting requirements in the properties of castings and ever-increasing complexity of casting shapes, more and more experience and knowledge will be required. Next, he discusses the terms of reference of the sub-committee and the means of establishing international co-operation by exchanges of information and by work carried out in concert. The importance of European foundry apprentice competitions is stressed and details are given of the scheme for the exchange of skilled workers between member-countries of the ECFA. Details are also included of the holiday camps arranged for young foundry personnel, and finally, the report tackles the difficult and important problem of the training of foremen. (A list of corresponding members of the training sub-committee is given at the conclusion.)

The terms of reference of the Training Sub-committee of the European Committee of Foundry Associations are to support, by intensified training, the different objectives the ECFA wishes to achieve in the extensive area covered by the member countries of the Committee.

Value of Training

There can be no doubt of the importance of training. Men are, and will remain, the instigators of all economic activities, and they will perform their task all the better if they have been well prepared. However, it is not sufficient to demand competence and find it ready made. On the contrary, it is the result of continuous effort by all concerned, both on the material plane, and in the realm of ideas. Experiments made in the sphere of training show indubitably that methodically-organized training can very greatly improve the worker's contribution to production, and that where the necessary aptitude exists this can be of a very high order.

Production of castings in the future will be characterized by progressive mechanization, by the improvement of raw materials used in the foundry, by more-exacting metallurgical properties of castings, the quality of their surface as well as by the ever-increasing complexity of their shapes. As a result of this evolution, all those who work in foundries are faced with tasks which require, for their successful execution, more and more experience, knowledge, judgment and sense of responsibility. It is therefore essential that training in the foundry should be adapted to present-day needs by the introduction of new methods.

Training is not only intended to pass on "know-how" and skill, it has also, in common with all other true education, an ethical purpose—the development of a man's character through his occupation towards a harmonious personality. In view of the important part his occupation plays in the life of a man, the right choice of trade is in a very large measure responsible for his happiness and for the prosperity of the community. Through the quality of their work, training can help people to achieve a standard of living related to their contribution, to satisfy their ambitions in standards of craftsmanship, and by the development of their skill, intellect and character to rise to the job which uses all their abilities and where they, therefore, serve the community best. The proper appreciation of men of the rôle they have to play in life is at the same time instrumental in maintaining and developing the industry and, consequently, its entire economic system.

Terms of Reference

The task devolving upon the sub-committee is two-fold; on the one hand, it consists in developing and expanding training in the foundry industry; and, on the other, it works towards establishment of an agreed common course of training amongst all the member-countries of the ECFA.

As regards the expansion of training, it is much more necessary to arouse and maintain the interest of foundry associations and of companies than has been the case in the past, and a natural result of such a development will be to give new impetus to the ambitions of young people. The value of an industry's worth is determined by the men who direct it and by those who work in it. This is why training must be regarded as of vital importance, for the possibility of continuous promotion constitutes one of the pillars upon which the future of the industry rests. There are many indications that the great technical changes and developments originate in colleges and centres of instruction of all kinds, and what is true for the economy as a whole is equally so for individual

* Sub-committee chairman.

sectors of industry and for individual undertakings. There are those who seem to have the impression that the benefit of instruction is not universally acknowledged and therefore may fail to appreciate sufficiently its necessity. It is true that training is a long-term investment which takes time to show results.

It is particularly important for the ECFA to consider training as a whole. Users evaluate castings not by the standards of the most advanced foundry or country, but by the most retarded. That is why there must be either a general progress or retrogression by the foundry industry as a whole. Such an alternative makes it all the more necessary to galvanize the consciences of everyone, right down to the smallest establishment.

"Harmonization" of training should in this context be understood as the establishment of common objectives to assure the same results everywhere as far as possible. Standards can best be set by the most advanced country. Thus, harmonization is not synonymous with uniformity of manner and methods of training. In the fields of training and technical education which are linked with the system of public education, legal obligations are divided differently in the various countries between the state, regional and local authorities on the one hand and industry on the other. It is not the intention of the sub-committee, nor, indeed, it is within its power to modify these arrangements. Moreover, account must be taken of the important rôle played in a general way by tradition in matters of apprenticeship. Systematic uniformity would perhaps not be the best formula to adopt. On the contrary, healthy competition is natural and necessary. Its aim should not be to crush competition at all costs, but to equalize its achievements. Does not the creative strength of the peoples of Europe lie in their diversity and their contrasts?

Means of Co-operation

By what means is the sub-committee trying to attain the objects outlined above? Without any doubt, the first preliminary to fruitful international co-operation is the establishment of personal contacts between the delegates of the countries represented on the committee, their intention to put their "cards on the table" and to recognise without envy the value of the achievements of others. At this point, it should be emphasized that all the members of the committee have co-operated in an exemplary manner, and have given proof of exceptionally wide vision. This continuing collaboration is assured by *exchanges of information* on their experiences, and by *work carried out in common*.

Exchanges of information on experience in the sphere of technical training are relatively recent by comparison with those in other technical fields. Information on training is exchanged at meetings which take place periodically, or at the time of reciprocal visits or when sub-committee members are invited to address audiences abroad. The immediate usefulness of these exchanges is evident, for there is no one on the committee who has not already been able to profit from valuable information or suggestions. So far as he is concerned, the Author of this report hopes that this is only a beginning. Amongst other matters, the question of the cost of training commands considerable interest. Training is not backed by tradition, as are the schools which dispense general education; on the contrary, training must, as a general rule, be newly conceived, organized and formulated, or be adapted to new developments. This work requires not only considerable intellectual effort, but also important financial investment. Today each country represented on the ECFA is in a position to be acquainted with the system and the means of training employed by the other member-countries of the Committee, and thus mistakes can be avoided and important economies effected.

European Foundry Apprentice Competition

Among the activities carried out in common in the sphere of the training of craftsmen first mention should be made of the European Foundry Apprentice Competition. By the objectives and conditions of its organization, this competition is unique and without precedent in Europe. By arranging such a competition the ECFA makes known to all the foundries and to the public that it is not only interested in a platonic way in the training of youth, but that it intends to pursue this objective with all the means available in an active, generous and modern manner. The first competition took place in 1957, at Stuttgart, the second in 1958, in Paris, and the third in May this year in Birmingham and London.

The competition is governed by rigorous rules. Each member-country of the Committee is entitled to send three competitors, who must possess their Certificate of Apprenticeship, or an equivalent diploma, and who must not be older than 20 years. The tests include the making of a mould and cores, as well as pouring a complicated casting after a period of preparation of about 12 hours; a written test in technology consisting of brief questions and one requiring more detailed treatment, together with tests in calculation and drawing. Each country taking part may make proposals for the tests; the choice is made by a special committee which endeavours, if at all possible, to incorporate one or two of the proposals put forward by each of these countries. The marking of the papers devolves upon a board of examiners, upon which each participating country may be represented by three judges. The three most successful candidates receive prizes. Recognition is also given to those who come first in the technology, drawing and practical tests as well as to the three best teams.

The ECFA has good reasons for inviting foundry apprentices to take part each year in this competition. International meetings of the young are a sign of the times. Freed from the fetters of the past, young people of all countries must be able to share their knowledge and help each other wherever possible. Young people who come from

the same trade have the advantage that they come from a similiar social background, have similar educational standards and interests, and are seeking to achieve the same objectives. The meeting of young foundry workers demonstrates in eloquent fashion that collaboration in the foundry industries of Europe applies also to the non-salaried staff.

On the other hand, a purpose of the European Competition is to *release for training hitherto undeveloped potentials* by applying to their work the educative advantages of the competition. In future, all foundry apprentices must make participation in the competition a personal aim of their apprenticeship. In this way, they will set themselves a target which will far surpass that attained by an apprenticeship properly speaking. It is to be hoped, also, that the competition will have *more and more the effect of creating a vocation for the foundry trade*. It offers a unique opportunity to familiarize a large public with the foundry trades by means of channels of modern communication. Finally the competition constitutes an eminently suitable medium for selecting and developing ability, and a comparative examination of the practical and theoretical results achieved by the apprentices will yield valuable conclusions regarding the value of the methods of training employed.

The two competitions already organized have fully justified themselves. The results achieved by the candidates were outstanding. Yet, the tests they were called upon to take required more knowledge and skill than is usually expected from those at the end of their apprenticeship. The tests were, without doubt, the utmost one could expect from young people of the age and capacity of the candidates. There is no doubt the professional ambition of the apprentices who took part in this competition has been greatly fostered. In addition, the European competition has become a subject of conversation among the young people in foundries and technical colleges. From listening to them, it becomes apparent that they aspire to attain the new target which is placed before them, and it will be the duty of their managers and teachers to maintain and increase this interest. Through the Press, radio and television, public opinion has been informed of the development and the results of the competitions and to an extent which has surpassed all expectations. High-level management and leaders of education have demonstrated the interest they take in these competitions by participating in the official ceremonies, which have been laid in a brilliant setting. The more the European competition can become a tradition, the greater success it will have from year to year.

Exchange of Skilled Workers

As much as it is necessary to intensify craft training on a wide scale, sight must not be lost of the obligation to arrange for the further training of those particularly gifted persons who have the necessary disposition and who may one day become part of the select few who everywhere and always lead a community. At all levels, the foundry needs men with creative minds, and the progress of the industry must not be left to chance for, if care is not taken, incipient gifts may be dissipated. A man will not give of his best unless he is given the chance and means to expand. The Committee considers that visits of limited duration abroad by young skilled workers having sufficient professional ability will contribute to develop leaders from among skilled workers. These exchanges have already been made for several years, particularly between France and Germany, and in the near future they will be augmented and extended to other interested countries. The immediate object of these visits is to enable young people to go and work in foundries of a friendly country, to augment their craft skill, so that they may be enriched and broadened by contact with a new environment on the human as well as the industrial level, and to give them a better understanding and appreciation of the people of neighbouring countries.

The trainees are carefully selected for these exchanges, and since as a general rule, they have never been abroad, they are carefully prepared for their visit. Their skill is equivalent to a young tradesman, minimum age is 19 years; they must have sufficient knowledge of the language of the host country to be able in normal conversation to make themselves understood without difficulty. Trainees are paid the standard wages in force in the host country, but they are considered essentially as apprentices, and are employed in the different workshops in such a way that they acquire an overall knowledge of production. A *mentor* appointed by the establishment issuing the invitations helps the young guest to surmount difficulties of various kinds arising in a strange country, and to make friends with young people of his own age and interests. They usually stay from three to six months. At the end of their stay abroad, students are required to write a report on their experiences in the country visited. Reports submitted so far show diligent application and an astonishing sense of observation. It appears also that friendships made during these visits are most congenial and likely to endure. It is hoped that these young men who have had the opportunity to enlarge their horizon so early in life will show themselves worthy of the honour conferred upon them by providing their worth and by encouraging co-operation and friendship between peoples.

International Holiday Camp

Amongst the plans for helping young foundry workers and the efforts being made to form an "élite" amongst them, there is a project for establishing an international holiday camp which will function for the first time in August, 1960. In this camp in the South of France, some 50 foundry apprentices, aged from 16 to 19, originating from member-countries of the ECFA will spend three weeks' holiday. The young men who will be invited to this camp are apprentice moulders who, by their diligence, conduct and achievements, have merited this privilege. The visit will enable these young men to profit intelligently from their holi-

days enjoyed with boys of the same age and trade; they will rest from their work and, in addition, get to know the scenery and inhabitants of a country other than their own as well as establish friendly relations with young foreigners following the same trade and with the same outlook as themselves. The national groups of these young people will be conducted and helped by adult guides who speak French.

The holiday camps will be arranged in two stages. There will be a first stay of ten days at Vallon-Pont-D'Arc, in Ardeche. This camp is under the direction of the High Commissioner for Youth and Sport, and its personnel is to be entirely devoted to looking after apprentices, who will have opportunities for swimming, sailing, mountaineering and so on. Thereafter, they will spend five days at the holiday camp of the French Scouts at La Gaillarde, near Saint-Raphael on the Riviera. This camp also will be especially organized for the benefit of the apprentices. Here they will have boating, swimming (both surface and underwater), for which equipment will be made available. There will also be visits to wellknown places on the Côte d'Azur. After their return from La Gaillarde they will spend two days in Paris where, in a party, they will go sightseeing.

Foreman Training

Constant technical progress necessitates a continual increase in the number of people engaged in planning and supervision. This applies to managers as well as those whose task it is to work on the details of planning and the preparation, direction and control of production. It is essential that these men should have been trained by practical experience in the trade since their work is the result of a thorough knowledge of the application of methods of production. It can only be acquired during many years of practical work. In every industrial country the training of foremen is an important and difficult problem. It is therefore an urgent necessity for the training committee to find a solution as beneficial as possible for the foundry trade.

Everyone is agreed that aspiring foremen need appropriate training for their work. In addition to practical experience and theoretical knowledge in advance of ordinary workmen and organizational ability, the management must require them to have some ability in the control of men. To-day, the qualified workman who wishes to advance must not expect to climb the ladder by chance, but must fit himself by training to take the additional responsibility he seeks. The industry must at the same time show a clear way to a career and make it possible for him to achieve his aims.

The first attempt at comparing the training methods in the different countries has shown all the difficulties of this kind of international co-operation. For example, the words: chargehand, foreman and foundry technician may be translated, but the *exact sense* of the words, that is to say, the work and responsibilities which attach to the man described by each of the works differ profoundly from one country to another. Other differences arise from the fact that in one country the occupation described by a word may signify a higher status than in another, where it is used for the early grades of supervisors. In order, therefore, to base eventual discussion on a proper footing each delegation has undertaken to carry out a detailed analysis of the functions of the various grades of supervisors and technicians and also to indicate the kind of knowledge and ability required for each of them.

The work which the training sub-committee has been able to achieve has only become possible as a result of the friendly understanding with which the main committee of the ECFA has approved all its projects, by the substantial support given by the main committee and individual firms as well as by the unreserved common effort of all members of the sub-committee. The following are the corresponding members of the training sub-committee: Mr. H. Winandy (Belgium), Mr. J. Jeppesen (Denmark), Mr. D. Waeles (France), Mr. L. Frede (Federal Republic of Germany), Mr. F .C. Hayes (Great Britain), Baron A. Krayenhoff (Holland), Dr. E. Capello (Italy), and Mr. D. Escorsa (Spain).

Industrial Effluent Treatment

Simon-Carves, Limited, and Monsanto Chemicals, Limited, have pooled their research, engineering and operating experience in the treatment and harmless disposal of industrial effluent to form the Simon-Carves Monsanto Effluent Advisory Service. The service is administered by Simon-Carves, Limited, from its headquarters at Cheadle Heath, Stockport (Ches).

The service provides general advice on effluent problems, on-site and laboratory investigations on the treatment of specific effluents, recommendations and design data for effluent treatment processes and plants, and continuing advice on the operation of commissioned treatment plants. In addition, the engineering and contracting organization of Simon-Carves, Limited, is available for the actual construction, installation and commissioning of complete effluent treatment plants.

Disquiet about Exports

Failure of exports to rise since the beginning of the year and the rise in imports of manufactures are described as "disquieting" in the two-monthly review of the economic situation of the National Institute of Economic and Social Research. Since 1949, productivity has risen much faster in Germany, Japan, Italy and other countries than in Britain.

It is impossible to be sure about the future, says the review. Exports may edge upwards in coming months, but a substantial increase in exports in the rest of this year now seems doubtful. Demand in our main markets is not growing with much strength. It has been suggested that exports weakness reflected a world tendency for trade in manufactures to level out, but analysis of trends abroad indicated that exports of the main manufacturing countries had continued to grow fast.

Payment of Wages Act, 1960

By Lord Meston

The object of the Payment of Wages Act, 1960, is to enable wages in certain circumstances to be paid by methods other than cash. Up till now the "Truck Acts, 1831 to 1840," together with certain lesser Acts passed since 1831, have prevented this being done. The Acts used to prohibit wages from being paid by cheque unless the recipient was within 15 miles of a bank which issued its own notes, but now there are no such banks in England, and it is only in Scotland that such a procedure might be possible. Whilst the "Truck Acts" as a whole are in many respects still necessary, in other respects they are obsolete, and in some ways they need improvement.

Under the 1960 Act, under certain conditions wages may be paid other than by cash. It is essential, however, that the wage-earner should make a request in writing to his employer to that effect. The employer may signify agreement either by writing back or simply by paying the wages in the way specified by the employee's request.

The methods of payment authorized are:—(*a*) payment into an account at a bank, being an account standing in the name of the person to whom the payment is due, or an account standing in the name of that person jointly with one or more other persons; (*b*) payment by postal order; (*c*) payment by money order; and (*d*) payment by cheque.

The last mentioned method, namely, payment by cheque may be found convenient sometimes but is not likely to be made use of in many cases. If a wage-earner has a bank account of his own, he will generally prefer that his money should be paid directly into his bank account instead of being given to him by cheque, putting him to the trouble of sending it to the bank. On the other hand, if he has not a bank account he will have to cash his weekly cheque, and it would be more convenient for him to be paid in cash by the employer in the ordinary way. However, payment by cheque is permitted by the 1960 Act in case it may be found convenient. The method most likely to be used by mutual agreement is that of "payment into an account at a Bank," as a wage-earner earning a high wage may often find it more convenient not to be given a lump sum in bank notes each week. The arrangement to pay wages by one of these methods may be terminated by either party giving four weeks' notice in writing.

It may happen that the wage-earner is unable to be present at the place of employment, perhaps because of illness or absence on account of duty elsewhere. In that event the employer may send the wage-earner his wages, not by cheque but by money order or by postal order. However, if the wage-earner writes to his employer saying that he does not wish his wages to be paid by money order or by postal order then the employer still has to send the wages by cash. These particular provisions came into effect one month after the Act was passed, *i.e.*, on July 2, 1960. When payment of wages is made the employer must furnish to the employed person a written statement showing his gross wages, the amount of any deductions and the net amount payable.

Other Provisions

The remainder of the provisions of the 1960 Act come into effect six months after the Act was passed *i.e.*, on December 2, 1960. This is to give employers and wage-earners time to make arrangements if they wish to take advantage of the provisions in the Act. The one exception, is that of payment by cheque: the provisions for this method, as distinct from postal order, money order or paying into a bank account, do not come into effect until the Minister of Labour decides on an appointed day. The reason for this indeterminate delay is to give tradesmen ample time in which to discuss this question with the Minister.

There is undoubtedly a certain amount of anxiety among shopkeepers that if a large number of wage-earners get their wages by cheque they may want to cash the cheques the day after pay day, and they will expect grocers and other suppliers to cash their cheques for them. They are not obliged to cash these cheques, but if they do not the customer may go to another supplier who will, and so some shopkeepers are afraid that every week they will have to put an abnormally large amount of cash into their tills. This will not only be inconvenient but also an invitation to gangsters to break in after closing hours and help themselves to the contents of the till.

However, it is submitted that these fears—though by no means groundless—are not likely to be very formidable in practice. If a man intends to immediately cash a cheque he will not ask his employer to pay him by cheque, but will prefer to be paid in cash. Therefore, it would seem that in practice wages are not likely to be paid to any great extent by cheque. However, tradesmen must be given time to consider this point and to discuss it with the Minister free from undue haste.

PERKINS ENGINES, LIMITED, have secured a contract from the Danish firm of Droninborg Maskinfabrik A.S. for 400 1.6 litre Four 99 diesel engines which will be used in self-propelled combine harvesters. The company has already supplied 300 Four 99 engines to the Droninborg concern.

DAVY AND UNITED ENGINEERING COMPANY, LIMITED, Sheffield, and Associated Electrical Industries, Limited, have announced the formation of a jointly controlled and financed steelworks automation unit to apply new automatic control techniques to the processing of both steel and non-ferrous metals.

Hungarian Non-ferrous Research

The Hungarian Research Institute for Non-ferrous Metals, Budapest, has compiled a composite number of articles in Volume III of its proceedings, mainly on the subjects of aluminium production and metallurgy. What follow are synopses of articles of particular interest to foundrymen in this country.

Solution of Aluminium in Cryolite Melts in Air and in a Protective Argon Atmosphere, by J. Adam

Factors influencing the solution of aluminium were investigated by numerous experiments and the variations in aluminium loss caused by changes of temperature, time and height of the electrolyte layer were determined in an experimental set-up designed by the author. On raising the alumina content, the lowest aluminium loss was found at 5 to 8 per cent. Al_2O_3 content. The solution of aluminium was decreased during the experiments because a protective argon atmosphere—though not completely oxygen-free—and corundum crucible were used.

Influence of Certain Alloying Elements and Impurities on the Strength of Al/Mg/Zn Alloys, by Z. Buray

The author investigated the variations of strength of two, three, four and five-component alloys on a basis aluminium of 99.99 per cent. purity. The investigation of Al/Mg/Zn alloys showed that the strength after heat-treatment is increased by Zn more than by Mg, but that Mg has a more beneficial influence on elongation. The strength of the Al/Mg/Zn alloy is increased by the addition of small quantities of Fe, Cu, Ti and B, but Si has a very slight or perhaps even a detrimental influence.

Investigation of Gating Systems, by Gy. Emod and M. Solti

According to the investigation carried out on casting into a mould, a regular, undisturbed flow of metal can be obtained only if the runner is completely filled before the metal flows into the mould. This can be accomplished by gradually choking the runner or leading it below the level of the ingates. In the experiments, the authors strove to realize a set of conditions in the gating system which should make it possible for certain metals which had a tendency to turbulence to enter the mould cavity without eddying or turbulence. They investigated only the influence of positive factors, without taking into account those detrimental consequences which might arise in practice from a lack of knowledge or experience or from slipshod moulding work. According to their observations, steady flow may be attained in the downgate choked downwards if the junction of the runner cup and the downgate are rounded off with a radius of at least half the diameter and if the proportions of the runner cup compared to the downgate are such that the former can be kept completely filled during pouring. This conclusion is valid also for a circular runner cup and downgate.

When the level of metal in the gating system does not rise, heavy turbulence is observable at a rectangular junction of the downgate and runner in consequence of the heavy impact occurring at the moment of metal entrance. If the junction is made by a curved runner, impact and turbulence still occur—although to a lesser degree—on impinging on the upper level of the runner. It would seem suitable to instal a reservoir in the gating system above the junction to reduce the velocity, to stop turbulence and to ensure the undisturbed filling of the runner. In the absence of internal fillets or radii, rectangular junctions of broad ingates prevent the complete filling of the ingate, since the metal enters the mould cavity asymmetrically, with a great velocity and it is of no avail to provide even a three- to five-fold increase in the overall cross-section of the ingates. This drawback may be corrected if the initial cross-section of the ingate has a narrow oblique angle and ample radii. It is also a drawback of a runner situate at the same level as the mould cavity that complete filling occurs only rather late in relation to the rise of the metal level. If, on the other hand, the level of the ingates on the side of the casting are raised above the upper level of the runner, the latter will be filled before the metal enters the mould cavity. These conclusions are valid also for a closed circular runner. The basic experiments performed to date are of great practical value, but all the problems are not yet solved and their solution still demands several years of detailed experiments.

Metallurgical Abstract

Metal Recovery from Magnesium Foundry Residues

In a paper which was presented to the Institute of Metals by Mr. H. J. Simcox, Mr. S. B. Hirst and Mr. A. Young (all of whom are on the foundry staff of Magnesium Elektron, Limited), a new method was described for the recovery of magnesium from foundry residues. Under former conditions the recovery was of the order of 50 per cent. of the metal present in the residue. Following experiments, a small-scale pilot plant was installed capable of handling 350 lb. of the material. This consisted of a hollow, slightly tapered cast-iron cylinder 3-ft. long and 22-in. outside diameter, resting on two sets of parallel rolls—one set being driven through an electromagnetic coupling which enabled the speed to be varied over a wide range. After several months of promising trials, a full-scale unit was installed to handle batches of up to 1,000 lb.

Centrifuging resulted in the production of an inner layer of metal and an outer one of flux, the separation being well defined when treating magnesium/aluminium residues, but with magnesium/zirconium alloy there were three layers, the outer one being flux, the inner one of alloy, with an intermediate one of a mixed character. By smashing the brittle flux, the former type could be separated easily but this was not possible with the latter.

Practical Hints

The following practical hints are given: (1) If the residue be viscous, it must be liquified by low-melting-point additions. (2) The residues should be thoroughly mixed before centrifuging. (3) The temperature of the centrifuge barrel (150 deg. C., minimum), during continuous use can reach about 250 deg. C. (4) A suitable pouring temperature is of the order of 600 deg. C. (5) The desirable wall-thickness of the barrel is between three and four inches. (6) As the magnesium/zirconium type of alloy tends to oxidize, it is best to throw into the barrel some powdered sulphur during rotation. (7) The intermediate layer associated with this alloy can be removed by 24 hrs. soaking in water. (8) The speed of rotation chosen was 450 rpm.

It is stated that the average metal recovery from each 2-ton melt is from 75 to 100 lb., and the installation of the plant paid for itself in less than a year.

Equipment and Supplies

Ventilator

Ventilation in the average foundry is normally designed to deal with summer conditions and a proportion of the ventilators must therefore always be closed in the winter. Bearing this in mind, Colt Ventilation, Limited, Surbiton, Surrey, have recently introduced a new ventilator. The design (Fig. 1) is such that by simple cord-control, it can be opened wide to the sky, thus increasing extractive capacity by approximately 50 per cent. By adoption of this system, it is claimed that the cost of a ventilation scheme can be substantially reduced as fewer ventilators are required because the installation can be designed for average conditions, whilst at the same time, there is ample reserve of extract capacity to deal with hot, summer conditions.

For normal extraction, the top cover-flaps rest on stops, giving complete weatherproofing. A pull of the cord lifts the flaps of the top cover into the vertical position, thus giving the ventilator a clear opening. When the flaps are dropped into a third position, the ventilator is completely sealed.

The model is designed on aerodynamic principles with aero-foil curves, with the objective of producing positive extraction rates.

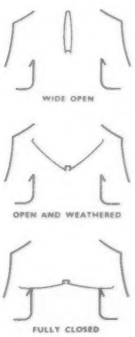


FIG. 1.—*Diagrammatic representation of the three operational stages of the new Colt ventilator.*

Cobalt 60 Radiographic Sources

Cobalt 60 sources for radiography with the high specific activity of 100 curies per gm. are now being prepared by Atomic Energy of Canada, Limited, and are available in the United Kingdom through the industrial division of Watson & Sons (Electro-Medical), Limited, East Lane, North Wembley, Middlesex. These sources are made up from nickel-plated, cylindrical pellets of cobalt measuring 1 mm. dia. by 1 mm. tall, which are double-sealed in welded stainless-steel capsules.

The main advantage claimed for the material is that the sources prepared from it have extremely small physical dimensions for their output, enabling sharper radiographs to be made or, alternatively, shorter source-to-film distances can be used, thus considerably reducing exposure times. Also the small dimensions give a lower degree of the wasteful self-absorption within the source. A wide range of standard sources made up from multiple units of the 100 curies per gm. material is now available and all of these sources can be fitted into the various containers in use to-day.

Speed-reduction Units

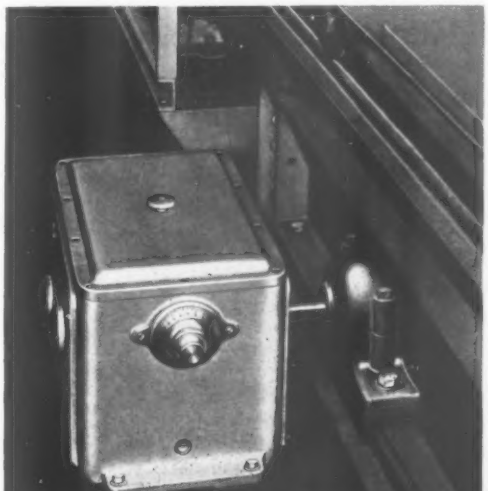
Fairbairn Ulro, Limited (a subsidiary of Fairbairn Lawson Combe Barbour, Limited), Wellington Engineering Works, P.O. Box 32, Leeds, 1, showed working models of their new variable speed-reduction units at a Press reception in London recently. Known as the "CONtorq" (Fig. 2), the unit is claimed to be completely positive and by virtue of the absence of fluid or friction properties, it is stated that it will maintain accurately the selected speed, regardless of changes in temperature, humidity or atmospheric conditions. The standard unit operates from a constant input-speed of 450 r.p.m., which is reported to give an infinitely variable speed-range on the output shaft of 0 to 50 r.p.m. Speed changes are made by the turn of a graduated dial; such changes may be effected whilst the unit is in operation or at rest; remote control by servo or push-buttons can be provided if required.

The CONtorq unit is finished in polychromatic paint and has machined faces, both on the input and output sides, which are intended for the mounting of auxiliary equipment, *i.e.*, flange-mounted motors, output attachments such as worm and wheel units, bevel attachments for change of direction, differential arrangements which will increase the output speed from 0 to 100 r.p.m. (or a variation of 100 r.p.m. at practically any speed, *i.e.*, 200 to 300 r.p.m. or 900 to 1,000 r.p.m.). Provided with a machined base and four holes for fixing bolts, the unit can be supplied with either right- or left-handed input and output shafts. The unit is sealed, is self-lubricating and has an oil-level indicator. The makers claim that it will run continuously with no attention other than an occasional topping-up with oil.

Peat

A few months' ago, the British Cast Iron Research Association published a report on "Use of Peat in Clay-bonded Moulding Sands" by Mr. W. B. Parkes, who summarized his findings in the following statement—"Tests made in the laboratory and on a large scale in foundries indicate that peat is a useful addition to greensand moulds. It is as effective as wood-flour in preventing scabbing and has two important advantages: the addition of large amounts has a less-harmful effect on moulding properties, and dirt inclusions—due to the friability of moulds which have air-dried by standing before closing—are less frequent. Only one size-grade of peat is at present available and this cannot be used to replace all grades of coal-dust

FIG. 2.—*Typical application of the "Contorq" variable-speed reduction unit. In the illustration, it is fitted to a platform-type mould conveyor.*



Equipment and Supplies

without deterioration in surface finish." A specially-ground peat is now being prepared commercially and marketed by F. W. Berk & Company, Limited (Berk House, P.O. Box 500, Portman Square, London, W.1) under the trade name of "Berkoal." This company operates an experimental foundry at London Colney, Herts, and has carried out extensive trials in the use of peat, as a result, the firm recommends the addition of 2 to 3 per cent. of the material at the mill when new sand is being used, with subsequent additions of sufficient to maintain 2 to 3 per cent. in the sand system. Under these conditions, it is stated that additions of coal-dust should be cut down by a similar amount and the addition of clay bond should be reduced to compensate for the increased green-strength developed by the peat.

As supplied, the peat contains about 40 per cent. water, and should be used in this condition. If dry peat is added to moist sand, it is reported that there is a gradual movement of water from clay to peat and an apparent drying-out of the sand accompanied by deterioration of its moulding properties.

As the use of peat in the foundry industry is expanding, new plant is being installed to cater for the demand, which has already reached the total of 100 tons per month. It would also appear that peat can be a suitable substitute for horse-manure as an ingredient for certain types of moulds.

Resin-coated Sand in Spain

Following a visit made by one of the directors to Spain earlier this year, Feslente, Limited, have now signed a long-term agreement with the Spanish firm, S.A. Auxiliar Quimica de la Fundicion Funquimica of Bilbao, whereby the latter firm will shortly commence to manufacture the UK firm's resin-coated sand in Spain under licence. Funquimica have been producing resin-coated sand in Spain for some 18 months past, but they will now be adopting the techniques and processes developed by Feslente in this country which should result in a product of substantially better quality, which will, undoubtedly, be of considerable interest to the rapidly expanding foundry industry in the Spanish peninsula.

Flexible Coupling: A new type of flexible coupling—Quadriflex—has been introduced by R. & J. Dick, Limited, power-transmission engineers, 3, McPhail Street, Greenhead, Glasgow. The coupling consists of two flanges and a two-piece flexible-rubber sleeve. The teeth of the sleeve-halves lock the teeth of the flanges without clamps or screws and tighten under the torque to provide smooth tansmission of power. The device is designed, it is stated, to provide all the four degrees of flexibility, angular misalignment up to 1 deg., parallel misalignment up to $\frac{1}{16}$ in. (depending upon shaft size), free-end float up to $\frac{3}{4}$ in. (depending upon coupling size) and torsional load (vibrating, uneven and shock). The coupling is claimed to be noiseless in operation.

Demonstration of Protective-clothing Material: Courlak, Limited, a subsidiary of Samuel Courtauld & Company, Limited, included a demonstration of "Textuff"*—the new fabric they have developed for protective clothing—at an exhibition in their new showroom at 143, Bond Street, London, last month. This material has been referred to earlier in these columns, and samples of it made up into gauntlets, spats and other articles of personal protection were on show in various colours. The material was developed for these purposes following its adoption at the Ford Motor Company's foundry; it is claimed that although it is not completely fireproof (as the term is referred to in British Standards), it repels sparks—and does not flame and that the usual sort of molten-metal splashes run off. Though hard-wearing, it is said to "breathe" and be light and comfortable in use. In addition to the firm (Arthur Miller & Company, Limited, 175, Bermondsey Street, London, S.E.1) previously quoted as makers-up of the material, the firm of Optoshield, Limited, 146, Clerkenwell Road, London, E.C.1, was named to the writer as having taken up safety-clothing manufacture in Textuff.

* Patent applied for; application No. 29156/59.

Sand Sales Merger: With the acquisition by British Industrial Sand, Limited, Redhill, Surrey, of the White Sand Silica Company, Limited—a subsidiary of Colin Stewart, Limited—the company will become responsible for the production of ground sand and silica quartz, and ultimately handle all sales matters through their own organization. As a first step in the new arrangement, Mr. Hadyn Taylor, managing director of British Industrial Sand, Limited, has joined the board of the White Sand & Silica Company. Other details have yet to be completed, but in the meantime all orders and enquiries should be sent to Colin A. Stewart, Limited, Wharton Hall, Winsford, Cheshire. Silica and quartz are the only two materials affected by the changes. British Industrial Sand will have no connection with any other materials supplied, or services rendered by the Colin Stewart organization.

Silicone Grease: A new silicone grease, M.494, has been added to the range of silicone products made by Imperial Chemical Industries, Limited, Nobel Division, Silicones Department, Stevenston, Ayrshire. The new product, it is claimed, is exceptionally efficient for use as a sealing agent for electrical equipment, and as a general agent to protect surfaces against moisture. Founders, it would seem, may find a use for the grease as a release agent in moulding and casting.

Self-priming Water Pump: A leaflet received from Ransomes & Rapier, Limited, Waterside Works, Ipswich, describes in some detail the firm's 4P40-type of self-priming water-pump. It deals with 40,000 gal. per hr., the volute and impeller being made of abrasion-resisting Meehanite metal. A shipping specification is included.

Data Sheets: Elcontrol, Limited, Wilbury Way, Hitchin, Herts, in Data Sheet TR/A describe the possibilities of a miniature process-timer and delay switch, and in Data Sheet FST, details are given of a flame-failure and ignition control unit for use with high-velocity air-blast tunnel burners.

Aerosol Packs: D.C.M.C. (Dudley Court Machine Company), Limited, 2a, Parkhurst Road, London, N.7, announce that they are now marketing a number of liquids, including a silicone mould-release agent, in portable spray units, known as aerosol packs.

Machine-tools: Hardinge Machine Tools, Limited, Feltham, Middlesex, has appointed Hodson Machine Tools, Limited, of 150 New Bridge Street, Newcastle-upon-Tyne, as local stockists for Hardinge collets, feedfingers, and guide bushes.

Correspondence

To the Editor of the FOUNDRY TRADE JOURNAL

MELTING IRON IN THE CUPOLA

Letter No. 1

SIR,—In your article on "Melting Iron in the Cupola" in the April 14 issue of the JOURNAL, I would like to ask a question on a remark made on page 465. You say "although in theory the charges descend the shaft uniformly, in actual fact melting undoubtedly proceeds more rapidly in the centre, so that the falling charge layers assume a U-shape." I have been, rightly or wrongly, under the impression that the outside of the cupola is the hottest and was taught that if one charged a cupola by hand, the place to put the steel and large scrap was on the outside, with the smaller materials towards the centre. Will you please clarify this subject, so that I can confirm or adjust my conception of what happens.

Yours etc.

(*Name and address supplied.*)

[Editor's comment: To the article submitted by our contributor, the idea that charges do not descend the stack in a series of horizontal layers was deliberately added, because the view has been expressed in many circles that students have been misled by such an empirical appraisal of what happens. Since the article appeared, however, it is clear that opinion is by no means unanimous on this point and the following contributions serve to indicate some views which have been expressed by correspondents. The letters reproduced are from persons well-qualified to speak authoritatively when matters pertaining to cupola practice are discussed.]

Letter No. 2

SIR,—May I put forward my personal views relating to the article entitled "Melting Iron in the Cupola." Owing to the resistance offered by the coke, the blast does not travel at a uniform velocity throughout the whole of the coke-bed, but instead is diverted from the centre (of the bed) upwards and outwards to the cupola wall so that the maximum heat obtaining is in the upper region of the melting zone, but immediately next to the lining. Therefore, it follows that the upper region of the melting zone is very roughly in the form of an inverted cone, the apex of which probably reaches down to something less than halfway between the top of the melting zone and the level of the tuyeres. I believe that these conditions have a considerable influence upon the combustion reactions, on the CO/CO_2 relationship, and upon the amount of air required for efficient combustion, but I do not think them intense enough to have any bearing upon the pattern assumed by the descending charges and hold to the view that charges *do* descend more or less uniformly.

Yours etc.

(*Name and address supplied.*)

Letter No. 3

SIR,—Regarding the shape of the cupola melting-zone, the only factual information is that provided by the experimental work of Rambush and Taylor (JOURNAL, November 8 and 15, 1945 and IBF Proceedings, Vol. 38, 1944/45, p.A. 119). These investigators (showing great courage) quenched a cupola with water after five hours melting while it was still fully charged. They then carefully removed the charges and prepared a diagrammatic picture of the charge materials as disclosed on stripping. This diagram shows quite clearly that the lower limit of solid metal is in the formation of a "U" or inverted cone. From this, it appears that the metal charge descends more rapidly in the centre of the cupola or that the metal in the centre remains solid to a lower level than metal nearer the lining, because of differences in the temperature attained in the two zones.

Yours etc.

(*Name and address supplied.*)

NOTE: Other communications on this subject will be welcomed. Contributors to the correspondence columns of the JOURNAL must supply their names and addresses but publication of this information will be withheld if bona-fide reasons are given.—Editor.

Parramore's New Furnaces

F. Parramore and Sons (1924), Limited, ironfounders, Chapeltown, Sheffield, lit two new cupola furnaces at their Smith Street works on August 8, which had been installed during the annual holidays—over the previous fortnight. Mr. Ernest Parramore, chairman and managing director, Mr. Arthur Parramore, joint managing director, Mr. Graham Parramore, works director, and Mr. Alfred (Jack) Parramore, 73-year-old son of the founder of the firm, joined in the opening ceremonies. Mr. Alfred Parramore left a sick bed to make the first tap of the new furnace. In the evening of the opening day, the directors gave a party at a Chapeltown cricket clubhouse to their employees. The furnaces, which are fitted with equipment to eliminate grit, are expected to increase metal production by over 100 tons per week. This family firm, founded 56 years ago by Frederick Parramore, employs over 450 and produces castings for transmission, tool and agricultural machinery. The increase in production will most probably mean that extra staff will be needed.

British Standards Institution

A new British Standard for ingot tin B.S. 3252:1960 specifies requirements for three of the most widely used grades of tin, high-purity, refined, and common tin. (Standard methods of analyses for these three grades are in course of preparation). The chemical composition of each grade of tin is provided, and among the requirements in the general clauses of the nine-page specification are those relating to: selection of test samples; retests; certificate of compliance; inspection and marking. Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1, price 4s. 6d.

Another standard published by the Institution is BS. 3248:1960 covering sparkguards for solid-fuel fires, also obtainable from the sales branch: price 3s. 2d. post free.

First-aid (Revocation) Regulations, 1960

The Draft First-aid (Revocation) Regulations, 1960,* published by the Minister of Labour on August 5, revoke particular requirements about the marking and contents of first-aid boxes or cupboards in certain industries made before the first-aid provisions of the Factories Act, 1937, came into operation. These requirements have been reviewed in the light of the new standards for all factories laid down in the First-aid Boxes in Factories Order, 1959,† and are now no longer necessary.

* H.M. Stationery Office, price 3d. net.
† S.I. 1959, No. 906, H.M. Stationery Office, price 3d. net.

Notes from the Branches

South Africa

The last works visit of the 1959/60 session of the South African branch of the Institute of British Foundrymen was to the Meehanite foundry of Escher Wyss Austral Iron Works, Limited, Boksburg. Led by the branch president, Mr. K. H. Coombs, over 50 members and guests attended. Included in this number was a party of apprentices from the foundry class at the local technical college. The guests were welcomed by Mr. P. J. Morgan, company secretary. The foundry, together with other departments in the works has recently been modernised, and a considerable sum has been spent in this programme during the past three years.

Patternshop

The first department to be visited was the patternshop and here seven patternmakers are employed to provide the foundry with all its requirements both in wood and metal patterns and coreboxes. During the visit a "Boko" Universal, three-speed milling machine with a 44 in. stroke was shown cutting out one half of a 5½ in. corebox. The timber used was "Jelutong" from Thailand. This material is used for the majority of work in the shop, being found nearest in characteristics to clear pine. Other equipment in the patternshop consists of circular and band saws, disc sanders and a "Wadkin" planer with a capacity for 24 by 9 in. thick timber.

Foundry

The foundry is essentially of a jobbing nature, specializing also in a variety of pumps for the mining, paper and chemical industries. The total capacity is approximately 200 tons of iron and 25 to 35 tons of non-ferrous castings per month. The heaviest casting made in cast iron, weighed 11 tons. The foundry is divided into four main sections with a total complement of 30 artisans. The main bay contains the jobbing foundry with lean-to's for the mechanized section, coreshop and non-ferrous foundry.

Sand Plant

A "B.M.D." sand-conditioning and mixing plant with a production capacity of approximately 250 cu. ft. per hr. provides the mechanized and jobbing floors with synthetic sands and dry sand respectively. The whole system is electrically interlocked and an electrical flow diagram indicates which belts, conveyors or hoppers are in use.

Coreshop

A "V.S." coreshooter with an 18 by 10 in. table is used in the coreshop for the production of a variety of cores for ferrous and non-ferrous moulds. The majority of cores are made by the CO_2 Process. Two, 12-ft. long "Austral" dry ice convertors are situated underneath the corebenches and the gas is piped at a constant pressure to the coremaker's stations.

Jobbing Floor

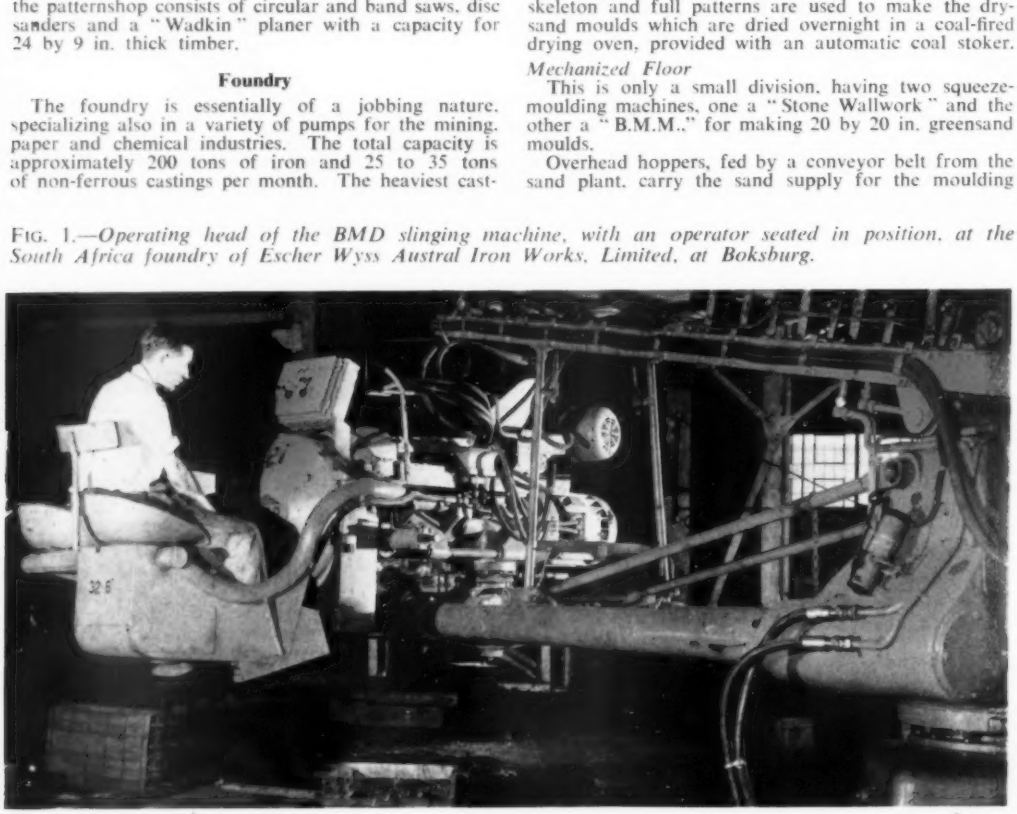
The jobbing floor is serviced by two overhead cranes of 5- and 20-ton capacity. Cast-iron moulding boxes are used and 90 per cent. of the moulds are rammed by a "B.M.D." slinging unit (Fig. 1) with an impeller speed of 1,500 r.p.m. A 2/3-ton hopper is situated immediately over the slinger feed belt with a rotary feed table to control the flow of sand. Strickles, skeleton and full patterns are used to make the dry-sand moulds which are dried overnight in a coal-fired drying oven, provided with an automatic coal stoker.

Mechanized Floor

This is only a small division, having two squeeze-moulding machines, one a "Stone Wallwork" and the other a "B.M.M.." for making 20 by 20 in. greensand moulds.

Overhead hoppers, fed by a conveyor belt from the sand plant, carry the sand supply for the moulding

FIG. 1.—*Operating head of the BMD slinging machine, with an operator seated in position, at the South Africa foundry of Escher Wyss Austral Iron Works, Limited, at Boksburg.*



machines. The moulds are set on gravity roller conveyors for casting. Moulds and metal are handled by an overhead monorail system. A 4 by 3 ft. mechanical shake-out is installed in this section, the returned sand passing under the floor to the sand conditioning plant.

Metal and Control

Two 36-in. dia. cupolas, basic lined, are operated on alternate days to provide metal at 1,400 to 1,450 deg. C. and at a rate of approximately 4 tons per hr. Metal charges weigh 7 cwt. and coke ratios vary from 5:1 to 7:1 depending on the type of Meehanite being melted. Temperature checks are made with an optical pyrometer and control tests by means of wedge samples.

The cupolas (Fig. 2) are mechanically charged by drop-bottom bucket which is loaded from stock bins and moved from bin to bin on a diesel-propelled scale truck. An electric hoist raises the charging bucket from ground level to charging door height, forward travel being controlled by an electric timing mechanism. On entering the cupola, a trip mechanism bumps against the cupola back wall, thereby operating the drop bottom door catch. The operations are then reversed and the buckets return automatically to the loading position.

A well-equipped laboratory is available for complete sand testing using "G.F." equipment. Carbon and sulphur checks are taken by the combustion/absorption method, silicon by chemical analysis and chrome, nickel and manganese or any other metal alloy by a "Feuss" spectroscope. An Amsler tensile machine, a hardness tester and miscroscope are housed in the company standards room.

Non-ferrous Section

A "Russ" channel-type induction furnace of 1,500-lb. capacity adequately meets the needs of the non-ferrous foundry for pump parts and various other castings. This unit requires a liquid head of metal to commence melting and this is provided by a 300-lb. oil-fired crucible furnace. This furnace is also used to melt small quantities of aluminium and other non-ferrous alloys. Barkly Bridge sand, a natural sand from the Cape Province, is used for all the moulds in this section.

All castings are fettled in the open air using standard and swing-frame grinders. A conventional shotblast room is used for cleaning the castings.

FIG. 2.—*Frontal view of the two 36-in. dia. basic-lined cupolas at Austral Iron Works, showing one of the drop-bottom buckets being hoisted.*

Other Departments

The boiler shop is mainly engaged in jobbing work and an all-welded tanker for the bulk transportation of cement was ready for despatch when members visited this shop. The tanker was 24 ft. long and of 7-ft. dia.

Sixty men are employed in the light and heavy machine shops which have 35,000 sq. ft. under roof. Wood-block floors provide a non-slip floor, besides being warmer than cement in winter.

The final call of the visit was to the standards room which is temperature controlled at 76 deg. F. All instruments and gauges are checked here. A thread measuring machine, capable of measuring to an accuracy of four millionths of an inch, is housed here. A photographic microscope with magnification ranging from 50/1,000 is used for examining metallurgical samples.

At the conclusion of the visit, refreshments were provided by the management, in the works canteen. The president, Mr. Coombs, thanked the management for their courtesy in allowing the members and guests to participate in a most interesting and informative visit. He complimented them on the layout and quality of workmanship, and made particular reference to the scrupulous attention paid to cleanliness inside each department and indeed throughout the entire works, covering an area of 11 acres.

A BOOKLET published by the South Wales Docks of the British Transport Commission sets out various sites available in the area for development by firms with import and export interests.

FOLLOWING its acquisition by the Baker Perkins, Limited, group of companies last June, Rownsons (Conveyors), Limited, has changed its title to Rownson Conveyors, Limited. The address and telephone number remain unchanged.

SHIPMENT of 5,729 tractors overseas in July by the Fordson tractor division of the Ford Motor Company, Limited, was claimed to be an all-time record by Mr. W. B. Batty, manager of the division.

EXPORTS BY AIR last year from the UK were valued at £142,900,000, an increase of £39,200,000 or 38 per cent. The largest single category of goods flown abroad was machinery at £43,200,000 out of total machinery exports of £625,600,000.

Pattern and Corebox Equipment

Mr. John L. Carter writing in the July issue of *Gray Iron News*, the house organ of the (American) Gray Iron Founders Society, on "Terms and Conditions of Sale of Patterns and Corebox Equipment" reproduces the following eight clauses, from among those which have been approved by the (American) National Association of Purchasing Agents:

(1) The customer must supply pattern and corebox equipment in a condition to produce economically the quality and quantity of castings required.

(2) An extra charge will be made if patterns require stopping off or if skeleton or sweep pattern-equipment is furnished.

(3) A foundry is not responsible for variations existing between blue-prints and pattern and corebox equipment supplied by a customer. If requested by a customer, the founder will check patterns and corebox equipment with blueprints at the customer's expense unless otherwise agreed to by the founder.

(4) All patterns, coreboxes and loose-pieces thereof, should be marked properly for identification.

(5) Follow-boards, core driers and similar devices when required, are to be furnished by the customer.

(6) Repairs and changes to patterns by a customer's orders will be made at the expense of the customer.

(7) All freight, drayage, boxing and crating charges on patterns, both to and from the foundry should be assumed by the customer.

(8) Pattern-storage facilities are provided by a foundry for active patterns only. Patterns not in use for a period of six months will be returned to the owner or will be subject to storage charges.

The writer then comments on these clauses and tells foundry owners how disputes with customers can be avoided by the intelligent application of the rules laid down.

Steel Output in July

Production of steel in July, a month in which several works closed for the summer holidays, was at an average of 391,400 tons a week compared with 466,400 tons a week in June and with 320,300 tons a week in July, 1959, the Iron and Steel Board states.

Pig-iron production was at an average of 288,900 tons a week compared with 295,000 tons a week in June and with 221,600 tons a week in July, 1959.

The preliminary results of the census of consumers' stocks of steel taken at the end of June suggest that stocks rose during the second quarter of this year by a little over 8 per cent., or of the order of 270,000 tons of finished steel. This follows an increase in the first quarter of 175,000 tons. The increase in stock in the second quarter is the largest recorded quarterly increase and approaches in magnitude the fall of 310,000 tons in the fourth quarter of 1958. The increase in sheet stocks in the second quarter of 1960 accounts for about a third of the total rise.

Latest pig-iron and steel output figures (in tons), with the corresponding 1959 returns, are shown in the following table:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1960—May ..	299,100	15,554,000	475,400	24,723,000
June ..	295,200	15,353,000	466,400	24,255,000
July.. ..	288,900	15,024,000	391,400	20,355,000
1959—May ..	240,500	12,504,000	384,600	19,999,000
June ..	235,300	12,235,000	388,500	20,200,000
July.. ..	221,600	11,521,000	320,300	16,654,000

Precision-casting Exhibit in New York

THE SHAW PROCESS
THE METHOD OF PRECISION CERAMIC MOLD CASTING
stronger, stronger, better and more
accurate products than those made
by machining methods.

In addition to the list of British firms quoted in "American Letter" (JOURNAL, August 11) as showing at the British Exhibition held in New York recently, Shaw Processes, Limited, had a display in conjunction with their American associates—Shaw Process Development Corporation. Alongside is reproduced a photograph of the stand; the large placard on the left made it clear that the process is a British development. Among the products on view were a forging die used in the automobile industry, a second-stage sustainer-nozzle for the Nike Hercules missile, a nozzle-ring and cooling-shield for a jet engine, a barrel support for an army M.-85 machine-gun and —to demonstrate the versatility of the process—a complete set of stainless-steel golf-club heads. Much interest in the process was shown by visitors to the stand and it appears that the possibilities of the process have been well established among American design and project engineers.

American Letter

Reclamation of Aluminium Castings*

Prenco Products Inc. of Royal Oak, Michigan, reclaims aluminium carburettor-body castings which have been rejected in production-line checks by using a metal-oxide sealant. It is stated that batch-type impregnation performed regularly by the company saves more than 85 per cent. of scrap-product costs, and the fact that the castings are fully machined adds to the total savings. (The figure of 85 per cent. is arrived at by checking the value of the rejected castings sold as scrap on the open market and deducting this amount from the manufacturer's costs at the production point.) Prenco achieves a 95 per cent. recovery of scrapped castings to yield net savings amounting to more than 85 per cent. of fabrication costs.

Operators of the process stack incoming parts in special baskets which they lower into an autoclave. After the lid is securely clamped, a vacuum of 29.5 in. of mercury is drawn and this voids all casting pores. Excess sealant is drained off the components after penetration and returned for re-use. Following removal from the autoclave, the batch enters a tank of cold water for a preliminary rinse. The basket unloads on to a three-stage, washer/drier/continuous-conveyor unit and the castings first encounter a cold-water-spray rinse, then a hot-water-spray rinse, and are finally blown dry. Prenco processes carburretor-body castings at about 720 per hr. for the four-barrel design and 1,050 per hr. for the two-barrel design. Without this method of impregnation, it would take 165 castings to obtain 100 sound ones. The total impregnation-cycle time is 29 min., made up as follow:—loading of autoclave 1.5 min.; drawing of vacuum 10 min.; introduction of sealant 3 min.; applying of pressure 10 min.; draining of sealant 3 min., and unloading of autoclave 1.5 min.

ASTM Reports

Die-castings

At the 63rd annual meeting of the American Society for Testing Materials, held in Atlantic City, New Jersey, from June 26 to July 1, several reports were presented on die-castings. Committee B-6 on die-cast metals, after studying the mechanical properties of test-bars produced in evacuated dies, reported that there were minor, but consistent, differences in mechanical properties in favour of the vacuum die-casting system —at the level of vacuum represented by the process used to produce the test-bars. The following comparison figures were given:—

	Vacuum	Non-vacuum
Tensile strength, tons per sq. in.	18.3	18.1
Elongation on 2 in., per cent.	17	15
Impact strength, ft.-lb.	41	39

In respect of the above figures, it was stated that the results did not confirm the claims which had been made indicating substantially superior mechanical properties for zinc die-castings made under vacuum conditions (of the order of 18 to 22 in. of vacuum) and the committee recommended further studies at higher levels of vacuum.

Another report dealt with atmospheric-corrosion exposure-tests of SC84A aluminium die-cast test-bars having zinc contents from 0.25 to 3.0 per cent. The approximate as-cast properties of the test-bars were tensile strength 17.9 tons per sq. in.; yield strength 8.9 tons per sq. in., and elongation 3.5 per cent. and had a nominal composition of copper 3.5; silicon 8.0; Mn. Ni, Mg and Zn, less than 0.50 per cent. each. The bars were exposed at the Kure Beach marine-atmosphere testing station and in New York City for 1, 3, 6 and 12 years.

Analysis of the data obtained confirmed the facts that alloy SC84 undergoes precipitation hardening as evidenced by the increased yield strength in all aged alloys and by the loss of ductility. The data also showed that zinc content at 0.25 per cent. gave the best resistance to atmospheric exposure. Alloy SC84 (with a zinc content from 0.25 to 3.0 per cent.), without any corrosion protective treatment, withstood the New York City environment without any appreciable loss of tensile properties. Ductility loss increased from 15 to 30 per cent. in the 6-year period for low-zinc alloy and was 50 per cent. greater for high-zinc compositions. Marine atmosphere corrosion at Kure Beach showed a 7 per cent. loss in tensile strength and a 40 per cent. loss in ductility in the first year for the low-zinc alloy with no significant change up to six years. The higher-zinc compositions lost 14 per cent. tensile and 50 per cent. elongation in the first year, with a further loss in elongation up to approximately 60 per cent. in the six years. Testing of the 12-year bars in 1965 will complete the programme.

Revised Standard Specifications

During their annual meeting in June, the ASTM also put forward proposed revised standard specifications for bronze castings for steam or valve applications. The valve-bronze revisions are editorial in essence, since they tie methods for chemical analysis and tensile testing to established ASTM methods for these tests, instead of spelling them out in detail as previously in the test of specifications. Cast bronze of the 85/5/5/5 and 86/6/1½/4 types are involved. (Full details may be obtained by application to the executive secretary of ASTM, 1916, Race Street, Philadelphia, Pa., USA.)

Labour Statistics

Both unemployment and employment increased in the US during June. This unusual statistical effect has been brought about by the influx of two-million teenagers graduating from the schools into the labour-force. Employment reached an all-time "high," 68,600,000—an increase of 1,400,000 from the previous month. Unemployment totalled 4,400,000—an increase from 3,436,000 in May. While the number of unemployed increased by a substantial amount, the current interpretation is that business activity in the US has reached bottom and current times point towards a gradual pick-up in activity. The current labour statistics are as follow:

Date	*Employed*	*Unemployed*
June, 1960	68,600,000	4,400,000
May, 1960	67,200,000	3,436,000
January, 1960	65,640,000	3,670,000
January, 1959	64,653,000	3,833,000

Renault Dauphine Car Production

The first Renault Dauphine car to be built in Argentina rolled off the assembly line last month at the Industrias Kaiser Argentina (IKA) Cordoba plant. IKA, an affiliate of Willys Motors, Inc., Toledo, Ohio, is currently undergoing an $11,000,000 expansion programme to increase automobile production from its current rate of 3,500 units per month to more than 4,150 units in 1961. In 1959, IKA produced 28,000 units and more than 40,000 vehicles are expected to be turned out in 1960.

* Abstracted from *Iron Age*, May 19, 1960.

Personal

Mr. V. C. PRICE has been appointed a director of Sandvik Steel Band Conveyors, Limited.

Mr. R. S. ALLEN, deputy chairman of W. H. Allen Sons & Company, Limited, has resigned from the board.

Mr. H. E. S. SEYMOUR has resigned from the board of Seymour's Castwell Foundry, Limited, Spondon, Derby.

Mr. J. H. TAYLOR has been appointed general factory manager of Massey-Ferguson's Banner Lane tractor plant in Coventry.

Miss HILDA FRASER, who is manager of the Glasgow showrooms of the Carron Company of Falkirk, is the first woman ever to hold this post.

Mr. P. M. J. BOULASSE, Mr. S. C. BURGESS, Mr. G. DURWARD and Mr. L. G. STOCK have been appointed directors of Richard Thomas & Baldwins (Sales), Limited.

Mr. WILFRED J. FRY, has been appointed sales director and commercial manager of Solartron-John Brown Automation, Limited, 20, Eastbourne Terrace, London, W.2.

Mr. E. B. THAIN has been appointed manager of Yates Plant, Limited, one of the Baker Perkins group of companies, at Bedewell Works, Hebburn on Tyne, Co. Durham.

Mr. ROBERT W. FIRTH, formerly technical representative for Sagar Richards, Limited, die-casters and engineers, of Luddendenfoot, Yorkshire, has been appointed a director of the company.

Mr. CHARLES A. STEVENS, who recently retired from the managership of the National Provincial Bank, Rotherham, has accepted an invitation to join the North Central Wagon Finance Company, Limited, in a consultative capacity.

Mr. C. M. STOCH, head of the engineering section of the British Steel Castings Research Association, Sheffield, recently returned to this country from a tour of steel foundries and metallurgical research institutes in Czechoslovakia and Poland.

Formerly director of manufacture, British Motor Corporation, Limited, Mr. A. J. BURTON has been appointed director of manufacturing services at the headquarters staff of the B.S.A. Company, Limited, at Small Heath, Birmingham.

Mr. ARTHUR L. KEY, formerly twice president of the Lancashire branch of the British Institute of Foundrymen, celebrated his diamond wedding on August 4. Aged 83, he is believed to be the oldest living member of the Institute.

Mr. DOUGLAS E. GRAHAM has been appointed chairman of the Council of the Institute of Export. He was appointed to the Council in 1952 and became vice-chairman in 1958. He is a director of the Staveley Coal and Iron Company, Limited.

Mr. J. D. NICHOLSON, chief engineer of the Yorkshire Electricity Board since August, 1950, has been appointed vice-chairman of the Board. He succeeds Mr. G. N. GREEN, who has been promoted chairman following the retirement of 66-year-old Mr. T. M. AYRES, who has held the post for six years.

Admiral Sir MICHAEL DENNY has been appointed chairman of Brown Brothers & Company, Limited, in place of Mr. IAN M. STEWART, who has resigned from that position for domestic reasons. Sir Michael is chairman of Cammell Laird & Company, and a director of English Steel Corporation, Limited.

The following appointments are announced by G.W.B. Furnaces, Limited, Dibsdale Works, Dudley, Worcestershire:—Mr. W. L. HARRISON, manager of the furnace division, Mr. J. SIMPSON, sales manager, melting division, Mr. J. NICHOLLS, sales manager, heat-treatment division, and Mr. A. HEAD, chief designer.

Mr. C. HOLLIDAY has retired from the positions of chairman and managing director of Joseph Stubbs, Limited, Manchester, and Mr. A. PEEL has retired from the secretaryship. Mr. E. BOR, LL.B., succeeds Mr. Holliday as chairman, and Mr. J. C. MARSDEN becomes managing director. Mr. G. W. TAYLOR, A.C.A., is now secretary. Mr. A. ROTHBURN, F.C.A., has also joined the board.

Mr. R. G. REDGWELL, general manager, and Mr. D. W. DAVIS have been appointed to the board of Wayne Tank & Pump Company, Limited, of Bracknell. Mr. Davis also becomes company secretary in place of Mr. R. E. CASTLE, who has retired after holding that position for 23 years. Mr. Castle remains a director of the company. Mr. G. M. INGLIS and Mr. R. C. PRICE have relinquished their directorships.

Mr. WILLIAM K. WHITEFORD, president of the Gulf Oil Corporation, has been elected a director of the International Nickel Company of Canada, Limited. Mr. Whiteford, who has been a member of the advisory committee of International Nickel since February, is a director of Mellon National Bank and Trust Company, of Pittsburgh, General Motors Corporation, Jones and Laughlin Steel Corporation, Procter and Gamble Company, Stouffer Corporation, Bank of Nova Scotia and Canada Life Assurance Company.

The fuel and the furnace research sections of the United Steel Companies' Swinden Laboratories at Rotherham, have been amalgamated under the leadership of Mr. A. PENGELLY, who previously headed the fuel section. This follows the appointment of Mr. C. HOLDEN, who was formerly head of the furnace section, to a senior post with the Salem Engineering Company, Limited. Mr. Pengelly was formerly principal physicist at the International Flame Research Foundation, in Holland, before going to the Swinden Laboratories nearly two years ago.

Mr. K. E. WALKER, director in charge of the engineering division of Newton Chambers & Company, Limited, Thorncliffe, near Sheffield, has been appointed chairman of the board of Rhodes and Halmshaw, Limited, of Ossett, Wakefield, the firm of sheet-metal workers recently bought by Newton Chambers. Also appointed to the board of the subsidiary company is Mr. FRANK WHITEHOUSE, general works manager of Newton Chambers' engineering division. This means that the full board for the time being will comprise Mr. Walker, and Mr. Whitehouse with Mr. G. HALMSHAW and Mrs. M. I. HALMSHAW, the present directors. Mr. R. J. V. WHEELER, secretary of Newton Chambers, has been appointed secretary of Rhodes and Halmshaw.

JAMES STOTT & SON, LIMITED—Mr. I. M. L. D. Forde has joined the board.

ELECTRONIC INSTRUMENTS, LIMITED—Following the acquisition of the company by the Cambridge Instrument Company, Limited, Mr. A. C. W. Norman will continue as chairman with Mr. Paul Goudime managing director and Mr. D. A. Pitman sales director. Mr. Goudime has joined the board of Cambridge Instrument and the chairman of that company, Mr. P. Dunsheath, together with Mr. H. C. Pritchard, managing director, and Mr. W. E. Lamb, director, have joined the Electronic Instrument board.

Book Review

Flames—their Structure, Radiation and Temperature (second edition, revised), by A. G. Gaydon, D.SC., F.R.S., and H. G. Wolfhard, DR.RER. NAT. Published by Chapman & Hall, 37, Essex Street, London, W.C.2; prices 71s. 6d. post free.

The first edition of this book was recognized as a standard work in connection with combustion phenomena with special reference to stationary flames. Since the publication of the first edition a considerable amount of work has been reported in the literature, and an opportunity has been taken in this second edition to bring the subject matter up-to-date, whilst still maintaining the emphasis mainly on physical principles. Large sections of the book have been re-written.

In the earlier chapters, the authors give a detailed account of premixed flames obtained by using various types of burners. Particular attention is given to flame stability and the factors which influence it. Flow patterns and flame shapes are discussed in detail and an account is given of the various techniques, such as Schlieren photography and interferometry, used for the investigation of flames. The techniques of measurement of burning velocity are discussed fully, a comparison is also made of the results obtained by differing methods, and a critical survey made of the interdependence of burning velocity, temperature, pressure, chemical structure of the fuel, diluents and additives.

An account is given of the mechanism of flame propagation and an assessment given of the various theories applied to this phenomenon; flame propagation in turbulent gases receives special attention. A detailed survey is provided of earlier work on diffusion flames and an appraisal given of more recent work on such topics as droplet combustion. Unstable flames are covered in a brief chapter in which attention is specially drawn to sensitive flames, singeing flames, flame vibration and noise; these latter two points are of special importance in rocket engines. The conditions which lead to the formation of solid-carbon particles in flames are discussed, particular attention being given to the physico-chemical aspects of these phenomena.

Radiation processes in flames are very fully discussed, and in two chapters the authors give a detailed account of flame-temperature measurement. Although special attention is given to the spectrum-line reversal method other techniques are described. Calculated values for flame temperature are the subject of a further chapter. The important topic of ionization in flames is also discussed, and the uses of micro-waves and electric fields to study ionization are described; the causes of high ionization in organic flames are outlined.

Combustion processes of rocket-type fuels are the subject of a separate chapter in which the authors have indicated the characteristics of those combustion processes where high energy or other unusual fuels or oxidizers other than oxygen are used. This chapter is one of the most valuable in the book. In a brief final chapter the authors give their views on recent progress on some flame problems.

The book is illustrated by a number of excellent diagrams and photographic plates—some of these in colour are quite outstanding—and a full list of selected references to the literature and subject and author indexes are included. Without doubt this book will be widely read both by those requiring an introduction to the subject, as well as by workers already engaged in research on flame investigations. It can be recommended without reservation.

J. E. GARSIDE.

Publications Received

Iron and Steel Trades in 1959. Published by William Jacks & Company, Limited, Winchester House, Old Broad Street, London, E.C.2.

In recent years, this expertly-written *Review* of the iron and steel trades, has carried information about the ironfoundry industry. From it the reviewer learns that he was mistaken when he doubted if the 1959 output of iron castings would equal that of 1958, as actually the production was increased by 30,000 tons. Whilst the *Review* rightly states that output is "no criterion to judge the value of the industry's contribution to the national prosperity," it fails to point out that weight of output is seriously affected by the production of pipe and tunnel segments. If, and when, the proposed underground railway is built between Victoria and Euston—providing the traditional method of construction is adhered to—then output of iron castings will prove to be a record since statistics have been available.

The *Review* refers to the close attention now being given to the metallurgical control of pig-irons, and forecasts that the future supply of better pig-irons will result from blast-furnace improvement, and that larger quantities will have to be made available to cope with the expected higher production of grey-iron castings during the next few years.

Sir John Cass College Prospectus Session 1960-61. Issued from Jewry Street, Aldgate, London, E.C.3.

Whilst at one time the Sir John Cass College was the centre of London for teaching foundry practice, this subject has now been replaced by courses in metallurgy. The main course is for day students and prepares them for examinations, success in which results in the B.Sc. (Engineering) Metallurgy degree. In the College there are limited facilities for research in the fields of physical metallurgy, melting and casting (including foundrywork). A number of evening courses are arranged in the following subjects: Metallurgical analysis; physical metallurgy; corrosion and surface treatment; fuel and refractories and the production of iron and steel. The requirements of the examinations organised by the Institution of Metallurgists are covered by a series of courses, which can be taken as part-time, day and evening studies. The head of the metallurgy department, Dr. D. H. Housman, will be pleased to advise students, and applications for enrolment must be made before September 1.

Aciers et Alliages Inoxydables Fortement Allies (Highly-alloyed Stainless Steels and Alloys). Published by the *Chambre Syndicale des Producteurs d'Aciers Fins et Spéciaux*, 12, Rue de Madrid, Paris, 8.

This publication is a report of a lecture given by Mr. J. Bourrat in which he reviews the various types of stainless steels currently used and includes in his survey molybdenum-containing 18/10; the austenite ferrite (straight and further alloyed) materials and Hastelloys B, C, D, and F.

Oxy-acetylene Welding-data Chart, published by Suffolk Iron Foundry (1920), Limited, Stowmarket, Suffolk, price 1s. 6d. (to cover postage).

Chart No. 1 initiates a new series of Sifbronze welding data and instruction charts. It has just been published and takes the form of a quick-reference chart which gives—against all the commercial metals in general use listed in alphabetical order—the weld-preparation details, melting point, filler rods, fluxing, oxy-acetylene flame setting, welding technique and

Publications Received

other important factors of interest to small welders. Measuring 24 by 20 in., the chart is printed in two colours on stout card-paper, suitable for mounting on plywood or hardboard. This means that it is extremely useful for display in welding shops, instruction schools and technical colleges.

Compressed-air Comments, No. 2. Published by Atlas Copco Editorial Bureau and distributed in this country by Atlas Copco (Great Britain), Limited, Marylands Avenue, Hemel Hempstead, Herts.

This book, because of the world-wide business connections of the company, is extremely interesting and perusal of its well-illustrated pages takes the reader from tunnelling in Australia for improved water supplies, to the painting of Jaguar cars in this country, then on to the North Pole. Here the firm undertook a job to keep small craft from being damaged by freezing during the long winter months. This was done by stirring up the warmer lower-layers of the waters by compressed-air lines.

Machinery's Annual Buyers' Guide. Published by the Machinery Publishing Company, Limited, National House, 21, West Street, Brighton, 1; price 12s. 6d. post free.

A new feature of this well-known work of reference is the inclusion of a Russian/English technical vocabulary covering 1,000 words. It is a bulky tome running to 1,114 pages and details the production of some 4,500 firms and also gives a wealth of ancillary information. The Guide is a very useful work of reference to have by one.

House Organs

Close-up, No. 18. Published by Armstrong Whitworth (Metal Industries), Limited, and Jarrow Metal Industries, Limited, Close Works, Gateshead-on-Tyne.

The reviewer cordially disagrees with Mr. George Blackburn, the author of an article in this house organ on the "Development of Electric-arc Furnaces," that the earliest types were somewhat "Heath Robinson." On the contrary, they were essentially simple and practical and some had a working life of 30 to 40 years; they were at least designed to tilt and not all open-hearth furnaces had that capacity 50 years ago! Early attempts—prior to 1914—were made to introduce automatic electrode control, but they were not a success for quite a few years. However, in a later section of the publication, when the author deals with the aircraft age, he is factually correct and his remarks are very interesting. The series of articles on "Roll Types and Applications" has now reached part III. They form a welcome contribution to the scanty literature on this subject.

Grits and Grinds. Vol. 51, No. 3. Published by the Norton Company, Worcester 6, Massachusetts, USA.

This is a special edition as it celebrates the 75th anniversary of the birth of the company, in 1885, in the F. B. Norton Pottery on Water Street, in Worcester, Mass. There is a first-hand account of the beginnings of the firm by the 87-year-old chairman of the board, Mr. G. N. Jeppson, who as a 13-year-old boy rode in the one-horse cart used to effect the removal of machinery to a new site in 1887. Another Mr. Jeppson tells readers of the present-day conditions and relates how Plant number eight, which houses the manufacture of all organic-bonded grinding-wheels, covers an area equal to five football fields—with further extensions still envisaged.

Newsletter, Vol. 12, No. 5. Issued by David Brown Industries, Limited.

This issue is especially interesting and has quite a foundry flavour. It celebrates the centenary of the establishment of the David Brown Group in 1860, when the founder opened up a master patternshop—he is pictured on the front cover at work with his only assistant. The whole issue is geared to current activities and stresses the extensive overseas businesses the firm has established. This magazine is clever at associating David Brown activities with events which make front page news in the daily Press and, in this issue, it takes the form of linking Donald Campbell's "Bluebird" with the transmission gear which the firm has provided for it. This edition is a fitting contribution to a firm which has grown from a personnel of two to an employment roll of 11,000 in its 100 years of existence.

Turnbridge News, Vol. 5, No. 3. Published by W. C. Holmes & Company, Limited, Turnbridge, Huddersfield.

Everybody in Yorkshire has heard of the famous Denby Dale pies, made to celebrate an historical event. It is recorded in this issue that there have been seven since the first was made in 1788, and the last, in 1928, unlike two others, was a huge success, moreover it was of record dimensions. The pie-dish measuring 16 by 5 by 1¼ ft. was made by the Holmes company, and the contents were sufficient for 20,000 portions, the sale of which raised £1,000 for the Huddersfield Royal Infirmary. This magazine, though existing mainly for the company's staff, has created quite a wide appeal through the choice of its articles.

Ruston Review and Paxman News No. 5. Published by Ruston and Hornsby, Limited, Lincoln.

As usual, this magazine takes the reader all over the world, as would be expected from a firm constantly manufacturing machinery for overseas customers. The story of the centenary of the firm of Greaves Cotton and Company, Limited, of Bombay, is told, as they have been concessionaires for Ruston products since 1889. The next article tells about the conversion of an Arab dhow from sail to diesel engine. Other articles deal with Ruston activities in Macao, Australia, Canada and Sweden. The magazine is well illustrated and written in first-class English.

Aluminium Courier No. 49. Published quarterly by the Aluminium Development Association, 33, Grosvenor Street, London, W.1; price 2s. 6d.

This issue comes in a new and larger format, which is reflected in a small charge having to be made for copies of this splendidly laid-out and illustrated magazine. From the foundry angle it is not a particularly good vintage, and only on one page (18) are there pictures of castings.

Metal Industries Group—Who we are; what we do. Published from Brook House, Park Lane, London, W.1.

This is the fifth edition of this useful booklet which gives details of the activities of the various companies in the Metal Industries group. It now includes particulars of the Lancashire Dynamo group which recently joined the MI organization.

News in Brief

THE FIRST Effluent and Water Treatment Exhibition and Convention is to be held at the Seymour Hall, London, W.1, from October 18 to 21.

HENRY WIGGIN & COMPANY, LIMITED, announce that they are holding exhibitions for the demonstration of the uses of their high-temperature alloys at the Grand Hotel, Sheffield, from September 20 to 22, and at More's Hotel, Glasgow, from September 27 to 29.

THE FORTHCOMING AUTUMN FAIR, to be held in Utrecht, Holland, from September 12 to 17, will contain exhibits—including metalware and cutlery—from 1,063 firms from 23 countries. Forty-eight British firms will be participating. The Fair covers a total net exhibition space of 16,000 metres.

Professor V. V. PARIN, director of the Institute of Natural Pathology and Physiology in Moscow, and three colleagues, Dr. K. P. VEZNO, and Mr. V. A. KLUKACHOL, recently visited Cambridge as guests of the Cambridge Instrument Company, Limited, and the Department of Physiology at Cambridge University.

THOS. MARSHALL & COMPANY (LOXLEY), LIMITED, are bringing into commission a new tunnel kiln at their Loxley works, Sheffield. It has cost about £50,000 and will increase production of casting pit refractories by 25 per cent. The firm has secured a similar production increase at their Wrexham works with a set of four oil-fired intermittent kilns.

WORKMEN at the locomotive works of British Railways, at Doncaster, are concentrating on completing a new locomotive to be exhibited at an international railways show to be held in London in October. The engine will be one of 20 ordered from the works to run the express high-voltage line between London and Liverpool, now being electrified.

PRODUCTS of the household and kitchen-equipment and utensil industries will be exhibited at the Finnish Industries Fair, which will be held in Helsinki in the 10 "Messuhallit" Exhibition Halls (and on adjacent open ground), from September 16 to October 2. These Fairs, held every five years, present a detailed cross-section of Finland's industrial production.

THE BRADFORD ENGINEERING and foundry firm of Hepworth & Grandage, Limited, has purchased a De Haviland Dove aircraft for the use of its executives. It was bought mainly because with the advent of the European Free Trade Area and possible working arrangements with the European Common Market, the company desires even closer contact with European customers.

A CONTRACT, worth over £250,000, for generating plant for an extension to the Hunt's Bay Power Station, Kingston, Jamaica, has been awarded to Associated Electrical Industries Export, Limited, by the Jamaica Public Service Company, Limited. Another contract, received by the transformer division of AEI, is from G.W.B. Furnaces, Limited, of Dudley (Worcs), for two 40,000 kva. arc-furnace transformers.

OF THE FIRST SIX HOLDERS of the Kodak scholarships in advanced photography who recently completed their year's scholarship course at the Regent Street Polytechnic School of Photography, Mr. Roger Bester won the Stanley Coleman Challenge Cup, presented by the Institute of British Photographers to the outstanding student of the year, and Miss Carolyn Clarke won the John Gibb Cup.

DOWTY GROUP, LIMITED, of Cheltenham announce that they have acquired Designex (Coventry), Limited, a company specializing in the design and manufacture of multi-spindle tooling and special purpose equipment. The directors of the company are:—Mr. J. C. G. Wegerif, chairman; Mr. E. G. Gibbons, managing director; Mr. W. Gibbons; Mr. Lionel Harper; Mr. W. Handley, and Mr. J. D. Knight. Mr. E. R. Beattie has been appointed secretary.

TWO NEW FACTORIES for engineering-industry production are to be built at Whitburn by Highland Engineering, Limited, of Edinburgh. On a 16-acre site near the town, they will be available for firms interested in producing components and accessories for the new British Motor Corporation factory at Bathgate which is now at the site-clearing stage. The Dunlop Rubber Company, Limited, are also building a new factory in this Whitburn area, extending to 100,000 sq. ft.

A GRANT OF £2,150 per annum for three years is being made by the chemicals division of Union Carbide, Limited, to Southampton University to provide for a research studentship and a research Fellowship in synthetic organic chemicals in the University's Department of Chemistry. Similar support by the alloys division of the company includes fellowships of £450 per annum to Sheffield University and £450 per annum to the Royal College of Science, Glasgow.

WARNER & COMPANY, LIMITED, manufacturers of special pig-iron, Middlesbrough, are making a one-for-one free share issue and splitting the existing £1 shares into four of 5s. The interim dividend has been trebled to 15 per cent. to obtain a better balance between the interim and final dividends. Mr. D. O. Sillars, chairman, has stated that he expects the total amount distributed for the current year will "not be less" than the total dividend and bonus of last year which reached up to 60 per cent. from earnings of nearly 157 per cent.

WHEN PRODUCTION BEGINS at the Hallside Works, Cambuslang, of Colvilles, Limited, the plant will be one of the most modern in the country. Nearly £5,000,000 has been spent on rebuilding the works, which were closed down in 1958, and in introducing a new billet-mill to supply special steels to the motor industry, and new melting facilities. Output at 3,000 to 4,000 tons per week will make it one of the biggest producers in the country of special and alloy steels. Several hundred men will be employed at the plant eventually.

COMMONWEALTH ENGINEERING (QUEENSLAND) PTY. LIMITED, of Rocklea, has secured a £341,421 contract to build 100 rail wagons for Thailand under the Colombo Plan. The order was obtained in the face of competition from all States, and will bring the total current orders of this company to over £4,000,000. The company is at present engaged on several large contracts for the Railway Department, including 300 wheat wagons, several locomotives, 20 diesel rail units, and 91 stainless-steel cars for use on Brisbane's suburban lines.

THE CENTRAL FILM LIBRARY, Government Building, Bromyard Avenue, Acton, London, W.3, announce that "Sharpening and Grinding," (UK1426), a one-reel film which runs for 13 min., and costs 5s. is again available. The film details sharpening of woodwork tools for the chisel, paring chisel, mortise chisel, gouge and other curved tools and the method of regrinding is also shown. Emphasis is laid on the need for preserving steel tools from rust. This is an excellent training film for technical college students and apprentices and is also of use for operatives.

£600 WORTH OF DAMAGE was done in the main paint shop of the Doncaster works of the Ford Motor Company, Limited, by a fire, on August 6, which was started by a spark from welding equipment. During extensions in the holiday close-down, elaborate

News in Brief

precautions had been taken against fire—asbestos sheets had been used and works firemen with special chemically-filled extinguishers have stood by. A stray spark started off the fire, but firemen prevented flames from reaching thousands of pounds worth of completed vehicles on the production lines.

SUBJECT TO THE SUCCESSFUL OUTCOME of negotiations, the Eclipse Foundry & Engineering Company (Dudley), Limited, and its subsidiary, Eclipse Metal Industries, Limited, will shortly join the Triplex Foundry, Limited, group of companies. The Eclipse companies make castings for the engineering industries in grey iron and aluminium and other non-ferrous metals. Its other activities include general machining, fabrications and assembly. The existing directors of Eclipse, Mr. A. C. Sheldon and Mr. J. E. Richards, will remain on the board and thus ensure continuity of management.

THE SCOTTISH COUNCIL (Development and Industry) has been exploring Russian trade prospects and has sent a delegation there to discuss future business. The members covered the sugar-machinery, electrical-motor, refrigeration, coal-cutting machinery, rolling-stock, pump, compressor and steel industries as well as some consumer goods producers. Reaction to the visit was reported to be excellent and although no immediate business has been placed, future prospects are regarded as sound. Russian buyers made it clear that they were interested only in good quality and efficient machinery at competitive prices.

IN SPITE OF THE DANGER of metal supplies from the Congo being discontinued owing to the upheavals in the country, big expansion schemes are still going to be carried out by the Tsumeb Corporation, one of the S. W. African lead, copper and zinc mining companies. Plans have been completed for a copper smelter, a germanium recovery plant is also being built and the construction of a lead smelter is being considered. Coincident with the decision to erect a copper smelter, the Corporation will reopen the workings at Kombat, about 60 miles from Tsumeb, and rail the concentrates to Tsumeb *via* Otavi.

A NEW £1,000,000 plant is to be erected at Mombasa, Kenya, by the Canadian company, Aluminium, Limited. A small factory will also be built at Dar-es-Salaam, Tanganyika. Work has already begun on the 10-acre site at Mombasa, next to the new oil refinery, and the basic part of the factory is expected to be finished within a year. About 400 men will be employed when both factories are completed. To start with, sheet aluminium will be imported for the production of semi-fabricated aluminium parts, to supply the industries already set up in Kenya. Once the factory is fully operational, aluminium ingots will be imported direct from Canada.

A NEW RESEARCH DEPARTMENT on machinability is nearing completion at Firth Brown Tools, Limited. An important unit in this is a new test lathe with exceptional power and speed. With this it is intended to explore the next generation of machine-tools designed to exploit more fully the potential of carbide and ceramic tools. The company also reports that Surform, the revolutionary universal file, invented and developed by the firm, continues to make progress under its licensee, Firth Cleveland, Limited. The firm has benefited from the general revival in the demand for engineers' cutting tools. A good year has been experienced both in home and export markets.

THE GAUGE AND TOOL MAKERS' ASSOCIATION is establishing a body to be known as: the Gauge and Tool Makers' Educational Trust. A company to be known as the Gauge and Tool Makers' Trustee Company, Limited, is being formed to act as the trustee of the Trust, and subscribers to its articles of association have been appointed. These subscribers will in turn appoint the directors of the Trust, who will act in close co-operation with the Gauge and Tool Makers' Association as the founder. The funds of the Trust have opened with a gift of £1,000 from Mr. Charles Grundy, who retired a few years ago from the managing directorship of a member-firm, and a substantial sum contributed by the Association as founder.

A MEETING of the Council of Association between the United Kingdom and the High Authority of the European Coal and Steel Community was held in Luxembourg last month. United Kingdom representatives were the Rt. Hon. Richard Wood, M.P., Minister of Power; the Rt. Hon. Frederick Erroll, M.P., Minister of State, Board of Trade; Sir James Bowman, chairman of the National Coal Board; and Sir Cyril Musgrave, chairman of the Iron and Steel Board. The High Authority was represented by its vice-president, Mr. Dirk Spierenburg, and members Mr. Albert Wehrer, Mr. Pierre Olivier Lapie and Mr. Fritz Hellwig. The Council considered reports from its coal, steel and trade relations committees and exchanged views on matter of mutual interest arising from them.

MR. P. J. C. BOVILL, the Master Cutler, was the chief guest at a dinner in the Firth Hall of Sheffield University, recently, at the end of the residential course on liquid-fuel combustion. Professor M. W. Thring, head of the department of fuel technology and chemical engineering at Sheffield University, pointed out that it was "particularly appropriate" for Mr. Bovill to be chief guest as he is a former member of the department and the first secretary of the Sheffield University students' union. The professor defined the course as one of "inspired improvisation" but Mr. E. E. Blandon, of Potterrton & Company, Limited, speaking on behalf of the 200 technologists who attended, said that there had been much "driving inspiration behind it" from Professor Thring and members of the department. It had been tremendously valuable and had awakened a very great interest in those who attended from all over Europe.

Obituary

Mr. A. W. GIBSON, principal of the Dudley and Staffordshire Technical College, has died.

Mr. V. L. NICHOLLS, a director of Grazebrook Foundry, Limited, of Dudley, died last weekend at the age of 45. Before joining the Dudley firm in 1944 he was associated with Smethwick Drop Forgings, Limited.

Mr. H. A. CROFTS, who was chairman of Crofts & Assinder, Limited, brassfounders and sheet-metal workers, Lombard Street, Birmingham, has died at the age of 82. Mr. Crofts served an apprenticeship in industry before joining the company of which his father was founder.

The death occurred recently of Mr. A. G. HOWELL, for 25 years foundry manager of Goulds Foundries, Limited. He served his apprenticeship in the pattern shop of the Taff Vale Railway Company at Cardiff Docks. Following this, he was with Goulds Foundries, Limited, Cardiff, as foreman patternmaker before becoming foundry manager. In these positions he became well known in the foundry and ship-repairing industries of the area and his passing will be regretted by his many friends in these industries.

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AP91

Raw Material Markets

Iron and Steel

Many ironfoundries have completed their annual holidays, but others will be closed between now and the end of August, and throughout the current month holiday influences will continue to affect production adversely.

Most of the engineering and speciality foundries producing high-quality castings are able with the work on hand to maintain outputs of castings at recent high levels. The most favourably placed for business are the foundries supplying the motor-vehicle industry, although many other trades, including heavy engineering, power and electrical plant manufacturers, and machine tool and agricultural implement makers are taking large tonnages of castings. From collieries and railways demands remain moderate.

Of the light foundries, those supplying castings to the building trades appear to be the most gainfully employed. Demands from the domestic utensil trade continue to suffer on account of the credit restrictions. At most of the light foundries, however, capacity is nowhere near fully occupied, and the jobbing and textile foundries, while fairly well employed, are also in need of more work.

The foundries have no difficulty in obtaining all the raw materials they require. Pig-iron in all grades is plentiful. The low-phosphorus irons continue relatively to be the most heavily in demand, but producing furnaces are able to satisfy needs, and hematite makers are also able to meet the requirements of users without difficulty. Refined irons are in good supply. Available supplies of high-phosphorus iron are more than sufficient to implement the orders arising, and producers continue to send consignments oversea when business can be obtained.

Scrap supplies are plentiful and the only scarcity, if any, applies to special grades. Foundry coke, ganister, limestone, and firebricks are all available to requirements.

Non-ferrous Metals

Evidence of a falling off in demand for copper, indicated by the July figures of the US Copper Institute contributed to the downward trend in prices at the beginning of the week on the London Metal Exchange and the backwardation in copper was eliminated for the first time since October. The general dull tone of the market was accentuated by reports of US smelter price undercutting.

Later the metal took on a steadier appearance, particularly cash which gained around 27s. 6d. a ton to re-establish a small backwardation. A small consumer inquiry was thought to have been prompted by the worsening Congo situation. LME stocks of refined copper held in LME official warehouses last week were 234 tons higher at 6,088 tons.

In London tin prices were unaffected by the sharp drop in Singapore where the price had, in any case, been considered too high in relation to the UK. There was, however, a marked increase in interest, probably because of the lower Singapore quotations. Tin stocks rose by 9 tons to 9,564 tons last week.

A firmer tone was evident for lead and was accompanied by a narrowing in the contango, reflecting the start of a new trading period, and, to a certain extent, the recovery in copper.

Apart from a slight narrowing in the contango, possibly because of the half-month settlement being out of the way, the market for zinc ruled steady in otherwise featureless trading.

New Catalogues

Annealing Furnaces for Malleable Iron. In a 12-page publication with this title, AEI-Birlec, Limited, Tyburn Road, Erdington, Birmingham, 24, first detail the processing requirements for malleable castings, as they differ between whiteheart, blackheart and pearlitic types. Furnace atmospheres, which, when properly applied, eliminate the need for cans and packing of castings, come in next for consideration and, finally, a series of furnaces—elevator, bogie-hearth, pit and bell, and pusher-hearth types—are described and illustrated with diagrams and clear line-drawings. Every malleable foundry should have a copy of this catalogue on its library shelf of trade literature. (Also received from the firm at the JOURNAL office is publication No. 806, which briefly covers applications in industry of the various equipment produced by AEI-Birlec.)

Mouldable Castable Refractories. In publication RD77 (section 2), Morgan Refractories, Limited, Neston, Wirral, Cheshire, detail the physical properties of about a dozen rammable refractories carrying an alumina content ranging from 35 to 98 per cent., all with the trade name of Tri-mor. The catalogue reveals that an enormous amount of research work has been undertaken to report upon the properties of the various types entering within the range. The reviewer suggests that in future issues the impressive inside-cover picture should carry a caption, and a column should be devoted to give information relative to the rammability of the refractories.

Union Carbide Metals Review. Vol. 1, No. 3. Published by the Union Carbide International Company, 270, Park Avenue, New York 17, New York, USA.

Malleable foundries will find interesting information in this magazine on the high-temperature (650 deg. C.) properties of the pearlitic type—the effects of alloying malleable iron with boron, bismuth, tellurium and molybdenum are touched upon. An important article is devoted to tungsten, giving its history and current uses.

Foseco Foundry Practice, No. 140. Published by Foundry Services, Limited, Long Acre, Nechells, Birmingham 7.

In this issue an article covering a defective grey-iron grooved pulley, carries a lesson of real importance, for it would seem that it was made by a foundry ignorant of the basic essential knowledge, since the pulley was made from a material of a wrong composition. At least after reading this article, any founder should, in the future, step off with the right foot.

Engine Components: Pistons, piston rings, cylinder-liners, valve-seat inserts, tappets, swirl chambers, rockers and centrifugal castings are well illustrated and described in a 12-page catalogue issued by the British Piston Ring Company, Limited, Coventry. In addition, a range of cast-iron bar—as-cast or ground—ranging from $\frac{5}{8}$- to 6-in. dia. is covered.

Overhead Runways. In section 6 of their main catalogue under this heading, Coburn Engineers, Limited, Peasmarsh, Guildford, Surrey, illustrate and describe a number of typical installations including those in a typewriter factory, a brewery and an abattoir. The fixing tracks, switch details, and other features are also covered by illustrated descriptions.

Baker Perkins Foundry Machinery at work ... *at the Southend Engineering Co. Ltd.*

This Baker Perkins Girojet Universal Shot Blasting Machine operates without compressed air, needs negligible maintenance and costs little to run. And here's another advantage—no foundations are needed. The Girojet will take an evenly distributed load of 500 lbs. Average shotblasting times: aluminium (2-4 minutes); grey iron (3-6 minutes); malleable cast iron or bronze (4.5-8 minutes); forged steel or stamped steel (10-20 minutes).

This is the machine that completely replaces the hand cabinet.

Please write for full details today.

Baker Perkins Ltd. ENGINEERS

Bedewell Division, Hebburn-on-Tyne, Co. Durham
Telephone: Jarrow 897124

HISTORICAL NOTE

Southend Engineering Company was established in 1901, and manufactured Marine and Stationary engines until 1914. The Firm has produced its own non-ferrous castings since 1938. They manufacture the "Viking 3" Outboard Motor, a set of flame guns for agricultural purposes, and a range of Stern Gear and fittings for marine engine manufacturers.

BP F10

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

August 17, 1960

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6d. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si· £42 10s. 0d. to £44 10s. 0d., scale 15s. 0d. per unit, lumpy; 75 per cent. Si, £57 15s. 0d. to £61 10s. 0d., scale 15s. 0d· per unit, lumpy.

Ferro-Vanadium.—50/60 per cent., 20s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 12s. 1d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 15s. 1d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £80 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr. scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0¼d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 10¾d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £61 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t.· 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 6 to 35 tons, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), under 10 tons, £34 17s. 0d.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting, under 10 tons, £36 14s. 6d. SIEMENS MARTIN ACID (under 10 tons): Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (under 10 tons).—BASIC: soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections (1 ton to 10 tons).—Ship plate (N.-E. Coast), £41 12s. 0d.; boiler plates (N.-E. Coast), £44 2s. 0d.; floor plates (N.-E. Coast), £43 10s. 0d.; angles (N.-E. Coast), £38 16s. 6d.; joists (N.-E. Coast), £38 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £67 17s. 0d.; nickel-chrome, £98 11s. 0d.; nickel-chrome-molybdenum, £111 4s. 0d., in lots of 5 tons to under 10 tons.

NON-FERROUS METALS

Copper.—Cash, £243 10s. 0d. to £243 15s. 0d.; three months, £243 0s. 0d. to £243 5s. 0d.; settlement, £243 15s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 4⅜d. per lb.; rods, 261s. 0d. per cwt. basis; 20 s.w.g., 296s. 0d. per cwt.

Tin.—Cash, £793 0s. 0d. to £794 0s. 0d.; three months, £797 0s. 0d. to £798 0s. 0d.; settlement, £794 0s. 0d.

Lead (Refined Pig).—Second half August, £71 2s. 6d. to £71 7s. 6d.; second half November, £71 10s. 0d. to £71 15s. 0d.

Zinc.—Second half August, £87 0s. 0d. to £87 5s. 0d.; second half November, £87 7s. 6d. to £87 12s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £123 10s. 0d.; rolled zinc (boiler plates), all English destinations, £121 5s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £102 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 11½d. per lb.; sheets to 10 w.g., 213s. 3d. per cwt.; wire, 2s. 9⅜d.; rolled metal, 213s. 3d. per cwt.

Brass (Brazing).—BS1400, B3, £172; B6, £223.

Brass (High Tensile).—BS1400, HTB1, £199; HTB2, £215; HTB3, £231.

Gunmetal.—BS1400, LG2, £218; LG3, £228; G1, ½%, £285; G1, 1%, £272.

Phosphor Bronze.—BS1400, PB1 (AID released), £315; BS1400, 90/10/1, £301.

Leaded Phosphor Bronze.—BS1400, LPB1, £239.

Phosphor Bronze Strip, etc.—Strip, 304s. 3d. per cwt.; wire, 4s. 2½d. per lb.; rods, 3s. 5½d.; tubes, 3s. 5½d.; chill cast bars, solids 3s. 5d.; cored 3s. 6d (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £69 15s. 0d. to £70 5s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £255, AB2, £263.

*Average 68-70 per cent.

Farnborough Exhibition

The Society of British Aircraft Constructors are holding their annual flying display and exhibition at Farnborough from September 5 to 11. Some of the stands which will be of particular interest to founders are briefly described below (the figures in brackets after the firm's name is the stand number).

CIBA (A.R.L.), LIMITED (*103*): A five-foot-long nose-cone for a guided missile, constructed from Araldite epoxy resin and glasscloth will be one of the main features of this display. Redux and Hidux bonding will also be featured and examples of bonded components will be on show.

DESOUTTER BROS. LIMITED (*222*): A complete range of Desoutter tools will be on display, including drills, screwdrivers, nut-runners, nibblers and shears, a number of which will be demonstrated.

NORTHERN ALUMINIUM COMPANY, LIMITED (*155*): Prominence will be given in this display, by means of photographs, to the aluminium rolling mill—said to be the largest and most powerful in Europe—which is now coming into production at the company's Rogerstone Works. Three new developments to be shown include an aircraft plate in Noral B19S, an alloy that retains good mechanical properties at elevated temperatures; Noralduct, a roll-bonded heat-exchanger plate incorporating ducts and cells in a specified pattern, and hollow sheet which also incorporates ducts formed integrally with the sheet during rolling, but there are in effect internal channels running through the sheet for its entire length.

Company News

DAVY-UNITED, LIMITED—Resolutions increasing the authorized capital and changing the company's name to Davy-Ashmore, Limited, have been passed. Accordingly the offer for the shares of the Power Gas Corporation, Limited, which has already been accepted in respect of over 90 per cent. of the shares, is now unconditional.

RUSTON & HORNSBY, LIMITED, engineers, steel and iron founders, of Lincoln—While the directors are still concerned with a number of problems, future prospects in a sufficient number of the company's lines are more encouraging than at the same time last year, states Mr. W. J. Ruston, the chairman. Net profit rose to £625.708 (£577.875) in the year ended March 31, 1960, and the dividend is increased from 8 to 9 per cent.

GREENWOOD & BATLEY, LIMITED, electrical and mechanical engineers, of Leeds—Arrangements are now in hand for the reorganization of the capital, the chairman, Col. H. A. Micklem announced at the annual general meeting. In reply to a shareholder, the chairman stated that in any reorganization, the partly paid preference and ordinary shares, which he understood were issued some 60 or 70 years ago, would be taken into consideration. The capital would then consist of two classes of fully paid shares only.

BETWEEN JANUARY 1 AND JUNE 30 this year, the Belfast firm of Harland & Wolff, Limited, launched no less than 120,000 gross tonnage of ships—a figure thought to be a world-production record in shipbuilding.

PIG IRON, All Grades
METALLIC ABRASIVES
SHOTBLASTING MACHINERY
FOUNDRY MACHINERY

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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7 6 (minimum charge) and 4d. per word thereafter. Box Numbers 2/ extra per insertion (including postage of replies). Situations wanted 2d. per word throughout

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisemen Manager, Foundry Trade Journal, John Adam House 17/19, John Adam Street, Adelphi, London, W.C.2. If received b first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY FOREMAN, A.M.I.B.F., requires similar position. Experienced in the production of high class grey iron castings for compressors, turbos, machine tools, gas engines, etc. Used to working on own initiative. Southern area preferred. Box FF762, FOUNDRY TRADE JOURNAL.

FOUNDRY SALES MANAGER—(47), high duty (Meehanite), nodular and grey iron castings up to 20 tons by machine, shell, floor, loam and CO_2 moulding. Sound technical knowledge, considerable commercial and administrative experience and staff control. Seeks similar position or as Technical Representative with foundry having good development programme with nodular and special irons. Box FS767, FOUNDRY TRADE JOURNAL.

FOUNDRY TECHNICIAN (28), A.M.I.B.F., seeks position West Middlesex area. Extensive pattern making, inspection and planning experience. Development of modern methods of production in mechanised non-ferrous foundry. Available September 1960. Box FT772, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER (33), graduate, extensive experience jobbing and mechanised production (mainly steel), development and cost control, seeks interesting consultancy assignments to widen experience. Nominal Fees. Box FM773, FOUNDRY TRADE JOURNAL.

WORKS ENGINEER (40), A.M.I. Plant.E., A.M.I.B.F., requires new post. Good background and experience installation, maintenance and development modern mechanised foundries and machine shops. Salary range £1,500—£1,700, assistance with housing. Box WE763, FOUNDRY TRADE JOURNAL.

YOUNG FOUNDRY METALLURGIST, H.N.C. Metallurgy, experienced in Grey and Malleable Iron, requires position with a firm appreciative of hard working metallurgist with drive and initiative. Salary dependent on results if desired. Present position, Works Metallurgist. Box YF776, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE with extensive connection in London and Home Counties with large industrial groups wishes to represent a foundry for cast iron non-ferrous die castings, etc. Good personal connection commission and part expenses. Box TR781, FOUNDRY TRADE JOURNAL.

APPRENTICE TRAINED MOULDER 32 years of age. Technically trained. Will train machine and floor moulding and control labour on shop floor. Box AT768, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER/SUPERINTENDENT/FOREMAN, blackheart, whiteheart, grey, 20 years executive, practical, technical, jobbing, mechanisation, desires post with progressive company where initiative is appreciated in Midlands. Box FM779, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

TRAVELLER/SALESMAN required for Southern England by leading Merchants handling all Foundry supplies and Foundry Machinery. Applicants, preferably with previous experience or especially with practical foundry knowledge, should apply to Box TS758, FOUNDRY TRADE JOURNAL.

METALLURGIST, 25-35 years, required to take charge of the Melting Shop of a small precision casting Foundry situated in the South. Salary in accordance with age and experience; housing may be available. Write giving details of age, experience, etc. Box MT771, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN, THOMAS POTTERTON LTD. (De La Rue subsidiary), Emscote Road, Warwick, have a vacancy for a man experienced in light grey iron castings up to half a ton using floor and mechanised production methods; must be first class foundry man capable of training labour and directing operations on shop floor. Only those wishing to progress to a more senior post later on need apply. Send full details of age, experience and salary required to PERSONNEL OFFICER.

FOUNDRY SUPERINTENDENT.

REQUIRED by modern medium sized foundry specialising in the manufacture of high alloy steel castings. Applications invited from persons having thorough practical and supervisory experience of production of steel castings and who are capable of accepting shop floor responsibility for moulding, core making and fettling department. Assistance with housing. Superannuation scheme, etc. All applications will be treated in strictest confidence and should include details of age, experience and salary required to PERSONNEL MANAGER, SHEEPBRIDGE ALLOY CASTINGS LTD., Hamilton Road, Sutton-in-Ashfield, Notts.

SITUATIONS VACANT—cont

MACHINE MOULDING FOREMAN quired. Staff position with produc bonus. Details of experience and sal required to FOUNDRY MANAGER, QUALTER SMITH BROS. LTD., Barnsley.

DRAUGHTSMAN. An opportun occurs for a man aged over 25 ye with H.N.C. Engineering to become Development Engineer and ultimately C Engineer with a well known firm of Ir founders and Engineers in the West M lands. Preference will be given to a m who has had similar experience or tra ing. Write in confidence giving full p ticulars to Box DA774, FOUNDRY TR JOURNAL.

QUALCAST LTD. require a FOUND METALLURGIST. The applic should have a sound knowledge of cup melting practice, sand control and found techniques, and should be educated H.N.C. standard or equivalent. Prefere will be given to applicants prepared to situated for foundries at Derby or at of our associated companies. Please s details of experience and qualifications PERSONNEL MANAGER, QUALCAST LTD., Vict Road, Derby.

STEEL FOUNDRY SUPERINTENDE AUSTRALIA

WANTED.—An experienced Su intendent for an electric s foundry organisation employing aro 250 operators. The person required m be a Journeyman Steel Moulder with & G qualifications plus 10 years' p apprenticeship experience in Jobbing Machine Moulding producing castings to 10 tons weight. Applications giv fullest personal details, trade experie and salary expected. Box WA775, FOUN TRADE JOURNAL.

MSL *have been retained to advise on the appointment of a*

WORKS DIRECTOR DESIGNATE

for a firm of engineers and ironfounders employing about 400, near the North-east coast of England. The appointment has come about by the impending retirement of one of the Directors.

The man appointed will be initially responsible to the present Works Director as his assistant. An appointment to the Board will follow a satisfactory qualifying period. He will be expected to make a critical appraisal of present methods and products with a view to their improvement and development.

Candidates in their thirties should have theoretical and practical engineering knowledge and be experienced iron-foundrymen. A degree or qualification in metallurgy would carry weight.

Starting salary up to £2,000. Please send brief details in confidence, quoting reference GT.2560, to H. C. S. Brand.

MANAGEMENT SELECTION LIMITED
17, Stratton Street, London, W.1.

In no circumstances will a candidate's identity be disclosed to our client unless he gives permission after a confidential interview at which he will be given full details of the appointment.

SITUATIONS VACANT—*contd.*

FIRST CLASS skilled JOBBING MOULDERS required by rapidly expanding company. Good working conditions, generous bonus scheme. Apply: FOUNDRY MANAGER, The Sandholme Iron Co., Ltd., Todmorden, Lancs.

LOOSE PATTERN MOULDERS required, for high quality machine tool castings in iron or aluminium. Attractive piece-work bonus. Lodgings can be arranged. Rail fare paid for interview. REGENT'S FOUNDRY, Catherine Street, Macclesfield.

FOREMAN required for small jobbing Foundry, producing high duty and grey iron castings. Pension scheme, and help with housing after trial period. Excellent prospects with expanding business. South West area. Box FR778, FOUNDRY TRADE JOURNAL.

METALLURGIST required for Foundry in the Midlands, able to help in the development of Steel Base Rolls. Box MR777, FOUNDRY TRADE JOURNAL.

WANTED FOR SOUTH AFRICA

GENERAL FOUNDRYMAN for Non-ferrous Foundry sand and gravity die Casting. Must be fully experienced in both. Opportunity for directorship for right man. Write giving full particulars of age, experience, etc. Box WF770, FOUNDRY TRADE JOURNAL.

RADIOLOGIST required to take charge of X-Ray and Gamma Ray Department attached to investment foundry at Redditch. A.I.D. approval a necessity for ferrous alloys, and preferably for light alloys and brass. Write, giving details of age, experience and salary required, to Box RA764, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required to take complete charge of Foundry, including machine moulding, plate moulding, and loose pattern moulding, making castings up to approximately 5 tons. Apply, giving details of experience and wages required, to J. VICKERS & SONS, LTD., Tackfield Foundry, Spring Vale, Darwen.

METALS & ALLOYS (B'HAM) LTD.

MINWORTH, SUT ON COLDFIELD

will be making appointments for the two posts of

ASSISTANT PRODUCTION MANAGER OF NON-FERROUS CENTRIFUGAL FOUNDRY

and

ASSISTANT PRODUCTION MANAGER OF DIE CAST IRON FOUNDRY

Each post will be responsible to the Cast Products Manager for production processes, including casting and machining. Applicants must have sound knowledge and experience of good melting practice and a knowledge of machine shop practice in each case will be an advantage. Each is a challenging post, suitable only for a man with definite management ability and capable of growing with this expanding Company. Applications to be addressed to the Works Director will be considered only in writing and they must give full details of age, education, training, experience, and present salary.

EDUCATIONAL

COUNTY BOROUGH OF BOLTON EDUCATION DEPARTMENT

BOLTON TECHNICAL COLLEGE
MANCHESTER ROAD, BOLTON, LANCASHIRE
Offers a two-year Sandwich Course for Advanced Studies in

FOUNDRY TECHNIQUES AND TECHNOLOGY.

FOR students who hold certificates of the City and Guilds of London Institute in Foundrywork or Pattern-making or National Certificates in Mechanical or Production Engineering, or equivalent qualifications combined with practical experience. Write for a prospectus of the course to the HEAD OF THE DEPARTMENT OF MECHANICAL ENGINEERING.

LANCHESTER COLLEGE OF TECHNOLOGY, COVENTRY.

Principal: A. J. RICHMOND, B.Sc.(Eng.)(Lond.), Ph.D., M.I.Mech.E.

COURSE ON "THE RUNNING AND FEEDING OF CASTINGS"

A SHORT course for Metallurgists and Foundry Technologists will be held on Friday and Saturday, 23rd and 24th September, 1960. Fee £1 2s. Particulars and application forms from Head of the Chemistry Department.

BUSINESS FOR SALE

ELECTRIC JOLT MOULDING Machine Business. Small valuation. Owner retiring. PICKLES, 64, Park Road, Chesterfield.

MACHINERY WANTED

PLATFORM DIAL SCALE required, 1 ton or 2 ton capacity. Avery or similar. Must be in good condition. Full details and price to: MORRIS (ENGINEERS) LTD., Eagle Lane, Great Bridge, Staffs.

MORGAN OIL FIRED Central Axis Tilting Crucible Furnace, 400 lbs. brass capacity, hand tilting. Good condition essential. Price and particulars to: GEORGE CHESWICK LTD., Mowbray Drive, Layton, Blackpool, Lancs.

MACHINERY FOR SALE

RUSTON HORNSBY 5-cylinder diesel electric generator, D.C., 30 K.W., 1,000 r.p.m., 480 volts. Also 80 K.V.A. Rotary Converter with transformer. J. WELFORD, 3, Devonport Street, London, E.1. Stepney Green 3110.

CUPOLA, 5/6 tons/hr., by E. A. Roper & Company complete with charger and fan. Box CU780, FOUNDRY TRADE JOURNAL.

MOULDING MACHINES.

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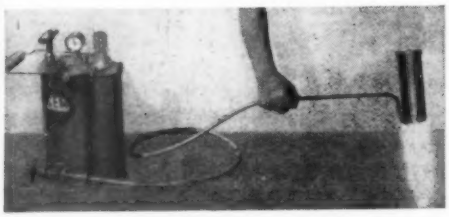

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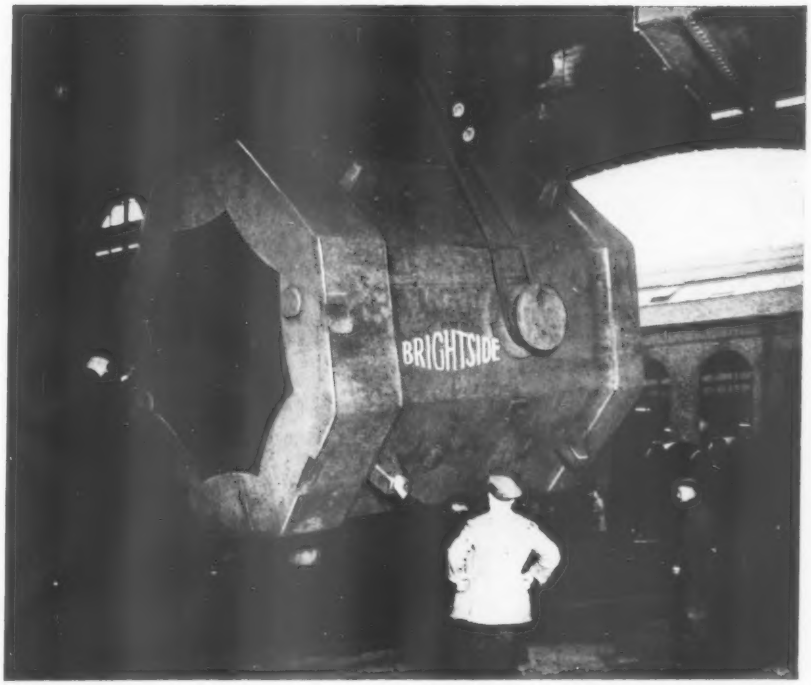

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